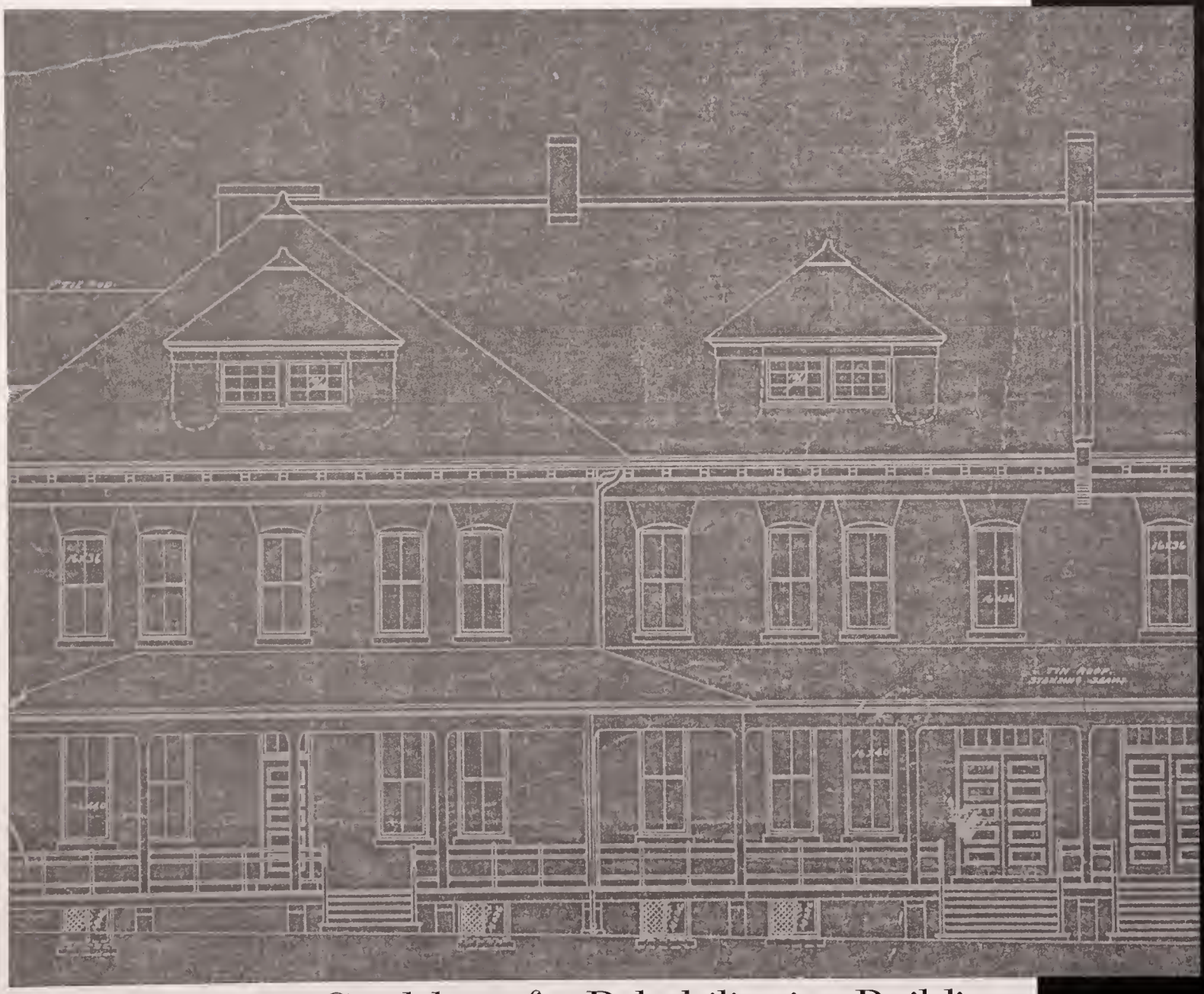

Guidelines for Rehabilitating Buildings at the Presidio of San Francisco

March 1995

Guidelines for Rehabilitating Buildings at the Presidio of San Francisco

Prepared by
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San Francisco, California

for
Presidio Project Office, Golden Gate National Recreation Area
Denver Service Center
National Park Service
U. S. Department of the Interior

Contents

Guidelines for Rehabilitating Buildings at the Presidio of San Francisco

March 1995

Introduction

Courtesy Presidio Museum, Golden Gate National Recreation Area, National Park Service

Introduction

Purpose of Guidelines for Rehabilitating Buildings at the Presidio of San Francisco

The *Guidelines for Rehabilitating Buildings at the Presidio of San Francisco* have been prepared to assist National Park Service professional staff, tenants, and their design consultants in rehabilitating structures on the historic Army post. The Presidio guidelines are intended to be a design aid in determining acceptable alterations, additions, and repairs for preserving the character of existing buildings. They are based on *The Secretary of the Interior's Standards for Rehabilitation & Illustrated Guidelines for Rehabilitating Historic Buildings*, published in 1992.

The Secretary of the Interior's Standards for Rehabilitation provide general information to determine appropriate treatments for historic properties. They are intentionally broad in scope to apply to a wide range of circumstances. *The Standards* were designed to enhance the understanding of basic preservation principles.

The *Guidelines for Rehabilitating Buildings at the Presidio of San Francisco* were developed to expand upon *The Secretary of the Interior's Standards* and to promote the understanding of acceptable design approaches and appropriate treatment for reuse of Presidio buildings. The Presidio guidelines borrow text from *The Secretary of the Interior's Standards for Rehabilitation & Illustrated Guidelines for Rehabilitating Historic Buildings* and present photographs and drawings of Presidio buildings.

Introduction

The *Guidelines for Rehabilitating Buildings at the Presidio of San Francisco* are intended to heighten the awareness of both designers and tenants to historically significant features, and to emphasize the importance of making every attempt to preserve and maintain those features when making alterations or additions to Presidio buildings. The criteria presented in the guidelines will be used by the National Park Service to evaluate the impact of a project's design on a structure's character, details, and materials.

The Presidio of San Francisco, originally established by the Spanish in 1776, has experienced continued use as a military installation under Spain, Mexico, and the United States. The 1,480-acre post was designated as a National Historic Landmark in 1962. More than half of the Presidio buildings are historically significant, because they contribute to the landmark status. These buildings must be preserved and rehabilitated in accordance with National Park Service policy and the guidelines presented herein.

Historic postcard, source unidentified

Crissy Field, late 1930's

Introduction

ACKNOWLEDGEMENTS

The Secretary of the Interior's Standards for Historic Preservation Projects With Guidelines for Applying the Standards was written by W. Brown Morton III and Gary L. Hume, and published in 1976. This document contains standards for rehabilitation, acquisition, stabilization, preservation, restoration, and reconstruction. The 1976 guidelines were revised and expanded in 1983 by Kay D. Weeks and Gary L. Hume and issued in a new publication—*The Secretary of the Interior's Standards for Rehabilitation With Guidelines for Applying the Standards.* The 1976 standards were revised in 1990 by Gary L. Hume, Kay D. Weeks, and H. Ward Jandl following a public comment period.

The Secretary of the Interior's Standards for Rehabilitation & Illustrated Guidelines for Rehabilitating Historic Buildings were codified in 36 CFR 67, and focus on "certified historic structures" as defined by the IRS Code of 1986. These regulations are used in the Preservation Tax Incentives program and should continue to be used when property owners seek certification for federal tax benefits.

In 1992, *The Secretary of the Interior's Standards for Historic Preservation Projects* were revised by Gary L. Hume, H. Ward Jandl, Kay D. Weeks, and E. Blaine Cliver, and republished under the new title, *The Secretary of the Interior's Standards for the Treatment of Historic Properties*, because they may be applied equally to buildings, structures, sites, landscapes, and objects. Treatments include preservation (under which "protection" and "stabilization" are now consolidated), rehabilitation, restoration, and reconstruction. The 1992 *Standards for the Treatment of Historic Properties* replace the 1983 *Standards for Historic Preservation Projects* (Federal Register Notice Vol. 48 N. 190, September 1983). These standards are not regulatory and may be used as guidelines by anyone planning work on historic properties.

For a copy of *The Secretary of the Interior's Standards for the Treatment of Historic Properties* (1992), write: Preservation Assistance Division, National Park Service, P.O. Box 37127, Washington, D.C. 20013-7127.

The *Guidelines for Rehabilitating Buildings at the Presidio of San Francisco* are based on the text of the original *Standards for Rehabilitation.* Photographs and drawings were provided by the National Park Service from its files and accessible archives or were produced by the staff of Architectural Resources Group. These guidelines are not copyrighted and may be reproduced without penalty, though credit should be given to the National Park Service and Architectural Resources Group.

Introduction

Foreword*

The year 1991 marked the 75th anniversary of the National Park Service as well as 25 years of preservation achievements since passage of the National Historic Preservation Act of 1966, which created the national register programs and established a nationwide federal/state partnership. Publication of *The Secretary of the Interior's Standards for Rehabilitation & Illustrated Guidelines for Rehabilitating Historic Buildings* fittingly coincides with the celebration of this important act. Since 1966, over 800,000 properties have been placed on the National Register of Historic Places through the joint efforts of State Historic Preservation Offices, federal agencies, Certified Local Governments, and the private sector. Over the past quarter century, historic preservation grants to the states for survey, planning, and rehabilitation have amounted to nearly $600 million—an investment totaling close to $1.2 billion with the inclusion of matching nonfederal funds. Additionally, the Preservation Tax Incentives, now in their 19th year, have contributed to the rehabilitation of nearly 22,000 historic properties, representing an investment of almost $15 billion in private funds.

The Secretary of the Interior's Standards have been used to determine the appropriateness of treatments for every grant-in-aid and Tax Act project over a 25-year period. By emphasizing repair over replacement, and limited rather than wholesale change to accommodate new uses, *The Standards* and their accompanying *Guidelines* seek to ensure the preservation of those qualities for which each property was listed on the national register.

The Secretary of the Interior's Standards for Rehabilitation & Illustrated Guidelines for Rehabilitating Historic Buildings are designed to enhance overall understanding of basic preservation principles. Specific examples of appropriate treatments, as well as the consequences of inappropriate treatments, are shown to encourage the most respectful approaches possible in rehabilitating our nation's irreplaceable historic properties.

* From *The Secretary of the Interior's Standards for Rehabilitation & Illustrated Guidelines for Rehabilitating Historic Buildings,* U.S. Dept. of the Interior, Washington, D.C., 1992.

Introduction

The Secretary of the Interior's Standards for Rehabilitation*

The secretary of the interior is responsible for establishing standards for all programs under Departmental authority and for advising federal agencies on the preservation of historic properties listed in or eligible for listing in the National Register of Historic Places. In partial fulfillment of this responsibility, *The Secretary of the Interior's Standards for Historic Preservation Projects* have been developed to guide work undertaken on historic buildings; there are separate standards for acquisition, protection, stabilization, preservation, rehabilitation, restoration, and reconstruction. *The Standards for Rehabilitation* (codified in 36 CFR 67) comprise that section of the overall preservation project standards, and address the most prevalent treatment. "Rehabilitation" is defined as "the process of returning a property to a state of utility, through repair or alteration, which makes possible an efficient contemporary use while preserving those portions and features of the property which are significant to its historic, architectural, and cultural values."

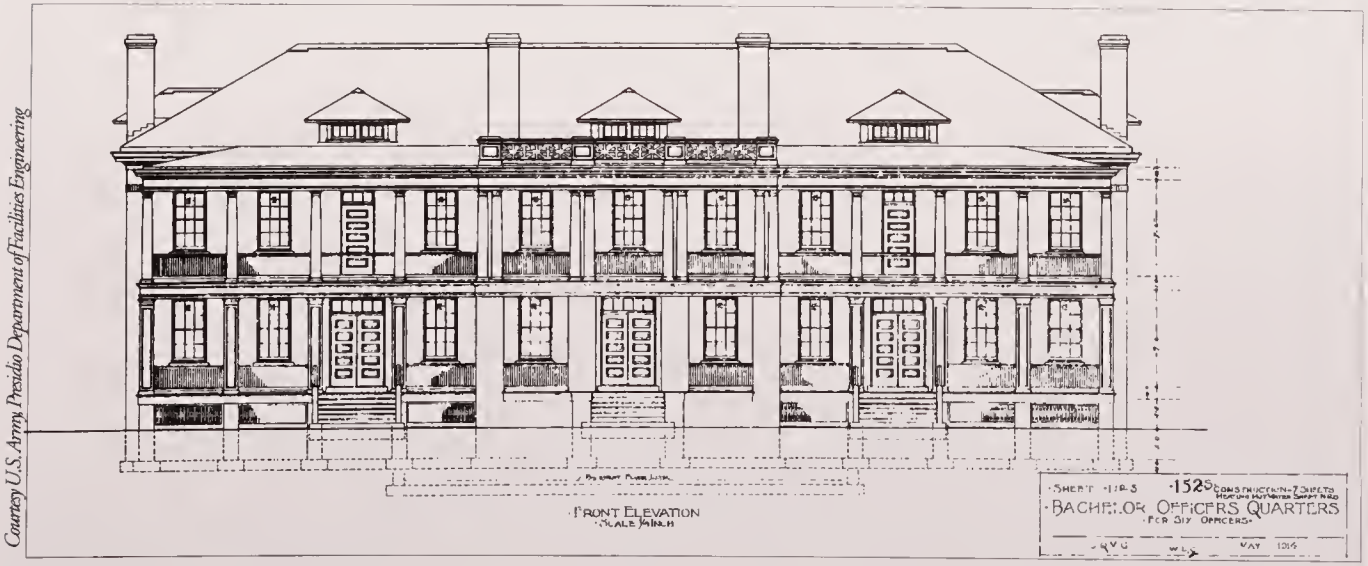
Initially developed by the secretary of the interior to determine the appropriateness of proposed project work on registered properties within the Historic Preservation Fund grant-in-aid program, *The Standards for Rehabilitation* have been widely used over the years—particularly to determine if a rehabilitation qualifies as a Certified Rehabilitation for federal purposes. In addition, *The Standards* have guided federal agencies in carrying out their historic preservation responsibilities for properties in federal ownership or control; and state and local officials in reviewing both federal and nonfederal rehabilitation proposals. They have also been adopted by historic districts and planning commissions across the country.

* From *The Secretary of the Interior's Standards for Rehabilitation & Illustrated Guidelines for Rehabilitating Historic Buildings,* U.S. Dept. of the Interior, Washington, D.C., 1992.

Introduction

The intent of *The Standards* is to assist the long-term preservation of a property's significance through the preservation of historic materials and features. *The Standards* pertain to historic buildings of all materials, construction types, sizes, and occupancy, and encompass the exterior and interior of the buildings. They also encompass related landscape features and the building's site and environment, as well as attached, adjacent, or related new construction. To be certified for federal tax purposes, a rehabilitation project must be determined by the secretary of the interior to be consistent with the historic character of the structure(s), and where applicable, the district in which it is located.

As stated in the definition, the treatment "rehabilitation" assumes that at least some repair or alteration of the historic building will be needed in order to provide for an efficient contemporary use; however, these repairs and alterations must not damage or destroy materials, features, or finishes that are important in defining the building's historic character. For example, certain treatments—if improperly applied—may cause or accelerate physical deterioration of the historic building. This can include using improper repointing or exterior masonry cleaning techniques, or introducing insulation that damages historic fabric. In almost all of these situations, use of these materials and treatments will result in a project that does not meet *The Standards.* Similarly, exterior additions that duplicate the form, material, and detailing of the structure to the extent that they compromise its historic character will fail to meet *The Standards.*



Courtesy U.S. Army, Presidio Department of Facilities Engineering

Introduction

The Standards (Department of Interior Regulations, 36 CFR 67) pertain to historic buildings of all materials, construction types, sizes, and occupancy, and encompass the exterior and interior, related landscape features, and the building's site and environment as well as attached, adjacent, or related new construction. *The Standards* are to be applied to specific rehabilitation projects in a reasonable manner, taking into consideration economic and technical feasibility.

1. A property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building and its site and environment.

2. The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.

3. Each property shall be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or architectural elements from other buildings, shall not be undertaken.

4. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.

5. Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a historic property shall be preserved.

* From *The Secretary of the Interior's Standards for Rehabilitation & Illustrated Guidelines for Rehabilitating Historic Buildings,* U.S. Dept. of the Interior, Washington, D.C., 1992.

6. Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.

7. Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.

8. Significant archeological resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.

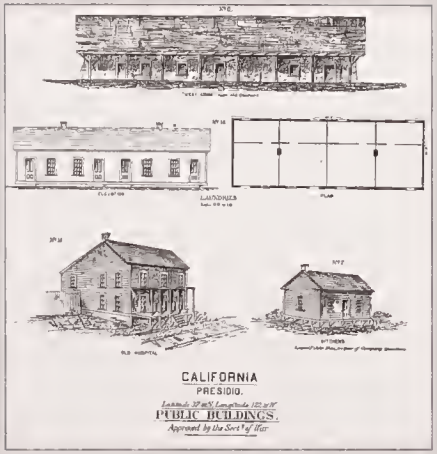
9. New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.

10. New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

Presidio Museum, Golden Gate National Recreation Area, NPS

Letterman General Hospital, early 1900's

Introduction



Courtesy California Historical Society, San Francisco

Guidelines for Rehabilitating Historic Buildings*

The Guidelines for Rehabilitating Historic Buildings were initially developed in 1976 to help property owners, developers, and federal managers apply *The Secretary of the Interior's Standards for Rehabilitation* during the project planning stage by providing general design and technical recommendations. Unlike *The Standards, The Guidelines* are *not* codified as program requirements. Together with *The Standards for Rehabilitation,* they provide a model process for owners, developers, and federal agency managers.

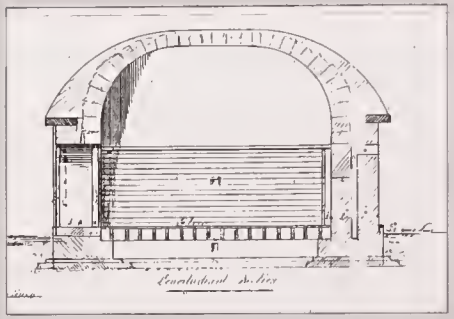
The Guidelines are intended to assist in applying *The Standards* to projects generally; consequently, they are not meant to give case-specific advice or address exceptions or rare instances. For example, they cannot tell owners or developers which features of their own historic building are important in defining the historic character and must be preserved—although examples are provided in each section—or which features could be altered, if necessary, for the new use. This kind of careful case-by-case decision-making is best accomplished by seeking assistance from qualified historic preservation professionals in the planning stage of the project. Such professionals include architects, landscape architects, architectural historians, historians, archeologists, and others who are skilled in the preservation, rehabilitation, and restoration of historic properties.

The Guidelines pertain to historic buildings of all sizes, materials, occupancy, and construction types; and to interior and exterior work as well as new exterior additions. Those approaches, treatments, and techniques that are consistent with *The Secretary of the Interior's Standards for Rehabilitation* are listed in the "**Recommended**" column on the left; those approaches, treatments, and techniques that could adversely affect a building's historic character are listed in the "**Not Recommended**" column on the right.

* From *The Secretary of the Interior's Standards for Rehabilitation & Illustrated Guidelines for Rehabilitating Historic Buildings,* U.S. Dept. of the Interior, Washington, D.C., 1992.

Introduction

To provide clear and consistent guidance for owners, developers, and federal agency managers to follow, the **Recommended** courses of action in each section are listed in order of historic preservation concerns to ensure the preservation of a building's important or "character-defining" architectural materials and features, making possible an efficient contemporary use. Rehabilitation guidance in each section begins with protection and maintenance—the work that should be maximized in every project to enhance overall preservation goals. If deterioration is present, repair of the building's historic materials and features is recommended. If repair is not possible, the replacement of historic materials and features with new materials is considered.



Courtesy National Archives, Cartographic Branch

Identify, Retain, and Preserve

The guidance that is basic to the treatment of all historic buildings—*identifying, retaining, and preserving* the form and detailing of those architectural materials and features that are important in *defining the historic character*—is listed first in the **Recommended** column. The **Not Recommended** column lists the types of actions that are most apt to cause the diminution or even loss of a building's historic character. It should be remembered, however, that such loss of character is just as often caused by the cumulative effect of a series of actions that would seem to be minor interventions. Thus, the guidance in the **Not Recommended** columns must be viewed in that larger context (i.e., for the total impact on a historic building).

Protect and Maintain

Protection and maintenance are addressed after identifying those materials and features that are important and must be retained in the process of rehabilitation. Protection generally involves the least degree of intervention and is preparatory to other work. For example, protection includes maintenance of historic material through treatments such as rust removal, caulking, limited paint removal, and re-application of protective coating; cyclical cleaning of roof gutter systems; or installation of fencing, protective plywood, alarm systems, and other temporary protective measures. Although a historic building will usually require more extensive work, an overall evaluation of its physical condition should always begin at this level.

Repair

Repair is recommended when the physical condition of character-defining materials and features warrants additional work. Guidance for the repair of historic materials such as masonry, wood, and architectural metals begins with the least degree of intervention possible, including such techniques as patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading according to recognized preservation methods. Repair also includes the limited replacement in kind—or with compatible substitute material—of extensively deteriorated or missing parts of features when there are surviving prototypes (e.g., brackets, dentils, steps, plaster, or portions of slate or tile roofing). Although using the same kind of material is always the preferred option, substitute material is acceptable if the form and design, as well as the material itself, convey the visual appearance of the remaining parts of the feature and finish.

Replace

An entire character-defining feature is replaced with new material if the level of deterioration or damage of materials precludes repair (e.g., an exterior cornice, an interior staircase, or a complete porch or storefront). If the essential form and detailing are still evident and can be used to reestablish the feature as an integral part of the rehabilitation project, then its replacement is appropriate. As with repair, the preferred option is always replacement of the entire feature in kind (i.e., with the same material). Because this approach is not always technically or economically feasible, provisions are made to consider the use of a compatible substitute material.

It should be noted that, while the National Park Service guidelines recommend the replacement of an entire character-defining feature under certain well-defined circumstances, they never recommend removal and replacement with new material for a feature that—though damaged or deteriorated—could reasonably be repaired and thus preserved.

Design for Missing Historic Features

When an entire interior or exterior feature is missing (e.g., an entrance or cast iron facade, or a principal staircase), it no longer plays a role in physically defining the historic character of the building unless it can be accurately recovered in form and detailing through the process of carefully documenting historical appearance. Where an important architectural feature is missing, its recovery is always recommended in the guidelines as the preferred course of action. Thus, if adequate historical, pictorial, and physical documentation exists so that the feature can be accurately reproduced, and if it is desirable to reestablish the feature as part of the building's historical appearance, then designing and constructing a new feature based on such information is appropriate. However, a new design that is compatible with the remaining character-defining features of the historic building is acceptable. The new design should always take into account the size, scale, and material of the historic building itself and, most importantly, not create a false historical appearance.

Courtesy U.S. Army, Presidio Department of Facilities Engineering

Alterations/Additions to Historic Buildings

Some exterior and interior alterations to a historic building are generally needed to ensure its continued use, but it is most important that such alterations do not radically change, obscure, or destroy character-defining spaces, materials, features, or finishes. Alterations may include providing additional parking space on an existing historic building site, cutting new entrances or windows on secondary elevations, inserting an additional floor, installing an entirely new mechanical system, or creating an atrium or light well. Alterations may also include the selective removal of buildings or other features of the environment or building site that detract from the overall historic character.

The construction of an exterior addition to a historic building may seem to be essential for the new use, but the guidelines emphasize that such new additions should be avoided, if possible, and considered only after it is determined that those needs cannot be met by altering secondary (i.e., non– character-defining) interior spaces. If, after a thorough evaluation of interior solutions, an exterior addition is still judged to be the *only* viable alternative, it should be designed and constructed to be clearly differentiated from the historic building and so that the character-defining features are not radically changed, obscured, damaged, or destroyed.

Additions to historic buildings are referenced within specific sections of the *Guidelines for Rehabilitating Buildings at the Presidio of San Francisco* such as "Building," "Site," "Roof," or "Structural Systems"—but are also considered in more detail in a separate section, "New Additions."

Energy Conservation/Accessibility Considerations/Health and Safety Code Considerations

These sections of the rehabilitation guidelines address work done to meet accessibility requirements and health and safety code requirements, or retrofitting measures to conserve energy. Although this work is quite often an important aspect of rehabilitation projects, and is assessed for its potential negative impact on the building's historic character, it is usually not a part of the overall process of protecting or repairing character-defining features. In the process of meeting code and energy requirements, particular care must be taken not to radically change, obscure, damage, or destroy character-defining materials or features.

Courtesy Presidio Museum, Golden Gate National Recreation Area, National Park Service

Infantry Terrace, 1925

Introduction

Sustainable Design

"Sustainability" is an approach to design that recognizes that every design choice has an impact on the natural and cultural resources of not only the local environment, but also regional and global environments. It embraces the concept that human civilization is an integral part of the natural world and, as such, has a profound effect, for good or ill, on the natural environment. To halt, and perhaps to repair, the environmental damage caused by the excesses of the past, we must incorporate the principles of globally interdependent environmental stewardship and social responsibility. As an agency whose central mission is the protection of both the natural and cultural resources entrusted to it, sustainability is an integral part of the National Park Service's design and management philosophy.

Sustainability recognizes that some portions of the built environment represent important touchstones with our past, and it is important that they be preserved. Some of these are so important that we set them aside to be preserved, virtually unchanged, for perpetuity. Others derive their importance primarily from being a part of a larger whole, such as a historic community or landscape. As such, these structures may be altered or "rehabilitated" so that they may continue to have viable uses so long as alterations do not degrade important features or characteristics. Indeed, building rehabilitation can be, by its very nature, a form of sustainability. Existing structures represent energy that has already been expended, materials that have already been mined or harvested, components that have already been manufactured—the embodied energy of past generations.

The Presidio structures derive their importance from being part of a historic community. In addition to the intrinsic sustainability of their continued use, the work employed in rehabilitating them can and should also follow the principles of sustainability. There are many ways that sustainability can be applied to building rehabilitation, such as energy conservation measures, the re-use of existing materials or components, and the use of new components made from recycled materials. The following sections address specific ways sustainability can be applied to particular topics.

Introduction

How to Use the Guidelines for Rehabilitating Buildings at the Presidio of San Francisco

The *Guidelines for Rehabilitating Buildings at the Presidio of San Francisco* are not intended to replace professional judgment or to stifle the creative design process. They are presented to call attention to conditions and solutions that may be encountered while rehabilitating Presidio buildings. These guidelines should be used by tenants, their design consultants, and National Park Service staff, in conjunction with guidance found in the Park Service's *Cultural Resource Management Guidelines* (NPS 28).

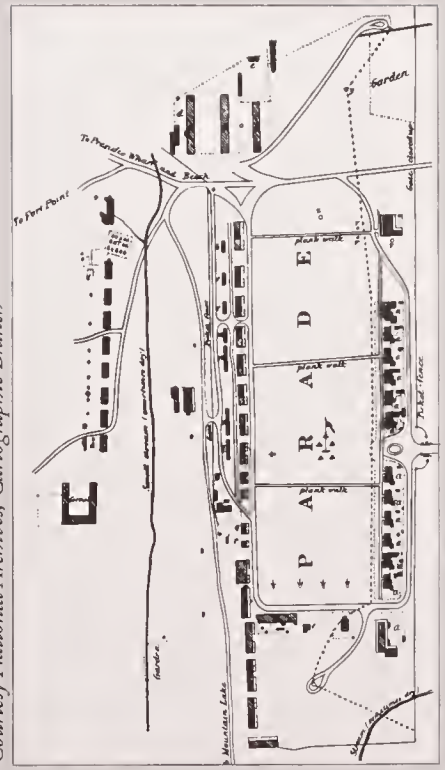
Users should review all of the introductory sections of the guidelines. Particular emphasis should be placed on becoming familiar with and understanding the general principles outlined in *The Secretary of the Interior's Standards*, which are restated earlier in this document. The Presidio guidelines are organized into chapters on building materials, features, and systems. In some cases applicability may not be obvious and an effort should be made to identify all pertinent chapters.

Perhaps the most important step in using the guidelines is identifying the features that are important to a particular building. *Identify, Retain, and Preserve* is the first topic listed in the individual chapters under the **Recommended** column. Once important features are identified, every effort should be made to preserve and maintain them during subsequent building improvements. In general, improvements and alterations should be additive in nature. When possible, existing historical features should not be removed but retained in place and improvements added to the existing conditions. Building users should carefully weigh options and alternatives before suggesting removal of significant features.

Additional information taken from studies conducted under the direction of the National Park Service may be available for specific buildings and assist in identifying significant features. The studies may also address similar buildings that could be used as examples of the type of features that are considered significant. The studies include:

- Historic Resource Study for Spanish-Mexican Period
- American Period Overview
- Building Inventory and Summary Report
- Prototype Building Assessments and Rehabilitation Studies

Introduction



Courtesy National Archives, Cartographic Branch

- Presidio Asbestos Abatement Survey Summary Report
- Assessment of the Public Health Service Hospital
- Cultural Landscape Analysis *(work-in-progress)*
- Historic American Building Survey Drawings
- Historic Resource Study
- Physical History Study
- Cultural Landscape Management Plan
- Building Inventory and Condition Assessment Program
- Archeological Overview Assessment

Historical photographs and drawings may also be available to assist in determining the historical significance of building features.

Within the chapters of the Presidio guidelines, original text taken from the *The Secretary of the Interior's Standards for Rehabilitation & Illustrated Guidelines for Rehabilitating Historic Buildings* has been supplemented with additional text, providing information more specific to the Presidio. Photographs and sketches illustrate examples of conditions found at the Presidio. While many potential problems in rehabilitating Presidio buildings are specifically addressed, others can be resolved by interpreting the *The Secretary of the Interior's Standards for Rehabilitation & Illustrated Guidelines for Rehabilitating Historic Buildings* and making reasoned decisions.

Building Site

Building Site

A building's site consists of both natural and designed features in the landscape. The organization and interrelationships of these elements and how they have changed over time constitutes the cultural landscape, which is the physical record of human impact on the land.

The Presidio's cultural landscape is not only its spectacular natural setting, but also how it has been shaped over time by human occupancy. The Presidio's historic identity and spirit are inextricably bound to its continuous military occupation since 1776. The Army's modifications were not limited to the built environment; the Army also introduced plant species and forests that greatly changed the character of the native landscape, which was originally covered by sand dunes and sparse vegetation. Today the Presidio combines areas of the landscape that are distinctly formal in character and more natural-appearing areas.

The intent of this chapter is to guide tenants in meeting their responsibilities in regard to the cultural landscape. Detailed treatment guidelines for specific areas within the Presidio are underway and are intended to be used by tenants when they become available. The tenants' zone of influence and obligation, in most cases, will be restricted to the designed portions of the landscape adjacent to the leased buildings, but may vary depending on the property, planning area, and whether a leased property is part of a cluster of buildings. This chapter does not address larger site development issues that are under direct National Park Service control, such as roadways, common parking areas, site signage, or management of the natural areas of the Park; these will be addressed in separate documents.

Overall objectives and area-specific plans have been outlined by the National Park Service in the *General Management Plan Amendment* for the Presidio. Any future changes at the Presidio should be consistent with the goals set out in this document. Additional guidance can be found in another National Park Service document, *Guidelines for the Treatment of Historic Landscapes* (Draft).

Generally, site treatment options for historic properties like the Presidio (that is, historic sites and their buildings eligible for or already listed on the National Register of Historic Places), include: protection and stabilization, preservation, rehabilitation, restoration, and reconstruction. Most of the site work at the Presidio will be limited to preservation and rehabilitation. These terms are defined as follows for the treatment of historic properties:

- *Preservation* maintains the form, materials, and features of the landscape as it has evolved over time, acknowledging its growth, loss, and change.

- *Rehabilitation* retains the landscape as it has evolved historically by maintaining and repairing historic features, while allowing additions and alterations for contemporary and future uses.

Building Site

The appropriate treatment for the grounds of a building will generally be the same as for the building. The main components of the cultural landscape are addressed in the following subsections: "Natural Systems," "Topography," "Views," "Spatial Organization," "Circulation," "Vegetation," and "Site Furnishings and Objects." These components are interrelated and form a dynamic system, so that any change to one component usually affects the others. Conflicts between the preservation of different aspects of the cultural landscape are inevitable, and since landscapes are dynamic by nature, conflicts may arise as the landscapes mature. All future modifications, additions, or changes to the site should always be reversible; this means that any modifications must be removable without damage to the original fabric.

The *General Management Plan Amendment* for the Presidio requires that the principles of sustainable design be integral to any proposed change to the built environment. Applying the principles of sustainability to site design means that activities that disturb or threaten sensitive habitats will be prohibited, and materials used for site treatments will be environmentally sound. Automobile dependence will be discouraged, and substantial amounts of paving will be removed. Natural systems, as well as native plants, will be restored when possible. Plant material should be selected after evaluating the life cycle of a species and its cyclical and long-term maintenance requirements.

Maintenance methods and treatments should be environmentally sensitive. An integrated pest management program will be implemented to minimize the use of pesticides and herbicides in order to avoid contamination of soil and surface runoff. Water conservation measures will be encouraged. These include the responsible selection of plant materials and watering systems, and use of reclaimed water for irrigation. Surface runoff should be minimized to control erosion, avoid contamination of soil and water, and avoid damage to building and plant materials located downhill. Hand pruning and hand watering may be more effective from a sustainable point of view than using mechanical equipment. Landscape materials that are removed from a Presidio property, such as top soil, fill, pavers, wheel stops, and site furniture, should be stockpiled for future reuse at the Presidio.

Environmentally sound materials should be used for new site furnishings and objects, e.g., natural, recycled, salvaged, and durable products made from renewable or biodegradable resources. It will be necessary to balance sustainable practices with landscape preservation needs when the two conflict. For example, a proposal focussing on energy efficency may specify trees for climate control in locations that block significant views or where trees never occurred historically; the effect of adding trees to the landscape must be balanced against the need for climate control.

A case study following this chapter illustrates the design process recommended for Presidio properties.

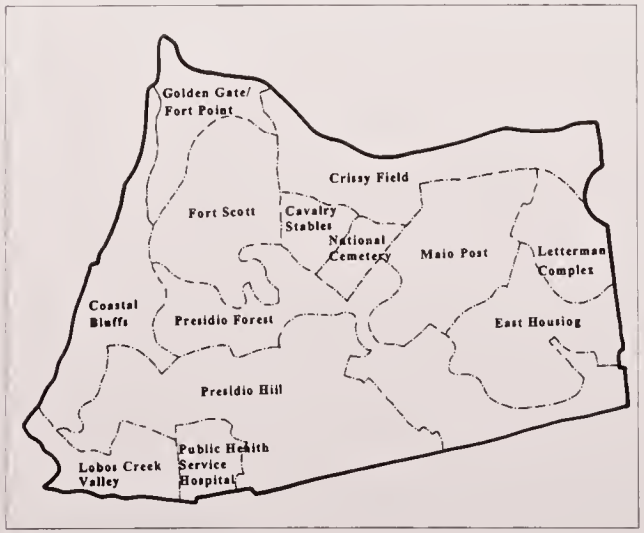
Courtesy Director of Engineering & Housing, Presidio

An aerial perspective of the Presidio of San Francisco illustrates the contrast between the Presidio's landscape and the rigid street grid of the densely developed city.

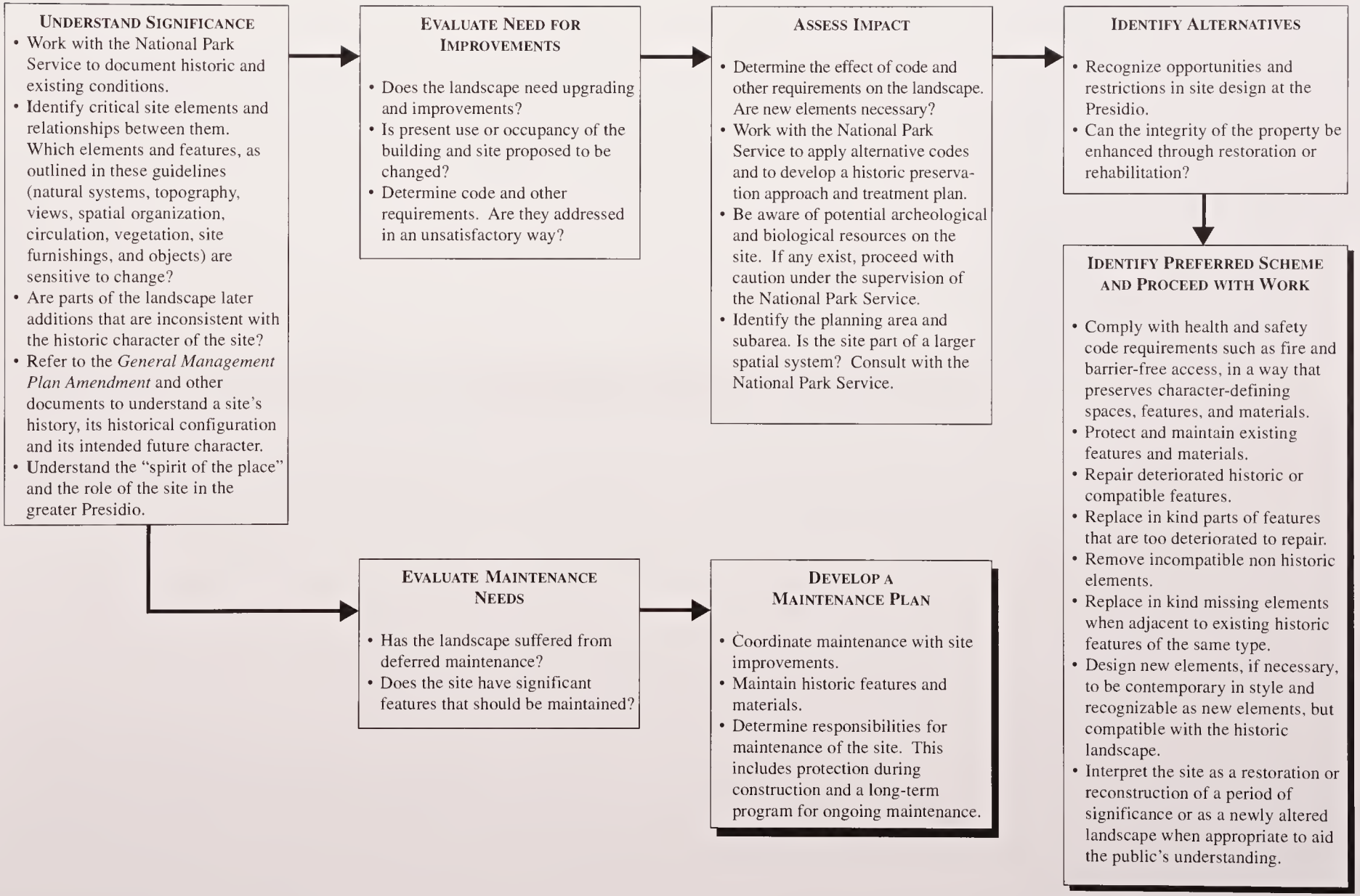
Building Site

Documents to be used as references in the design process illustrated on the facing page:

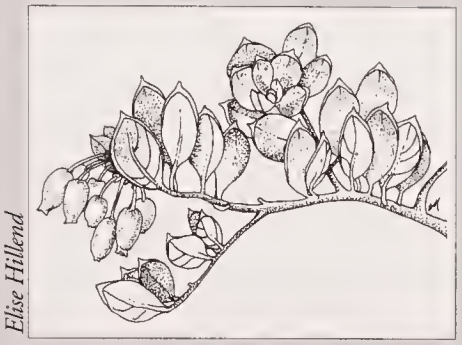
- Final General Management Plan Amendment, Environmental Impact Statement, Presidio of San Francisco. Golden Gate National Recreation Area, CA, July 1994.
- Cultural Landscape Analysis, Presidio of San Francisco *(work-in-progress)*. Prepared by Land and Community Associates for NPS-DSC, 1992.
- Forest Management Plan for the Presidio and East Fort Baker. J.R. McBride, Albany, CA, 1984.
- "Presidio Signage Guidelines" (*forthcoming NPS document*).
- Historic American Buildings Survey Report, Presidio of San Francisco, National Historic Landmark District, 1985.
- Presidio National Register of Historic Places Registration Forms. Prepared by Golden Gate National Recreation Area, National Park Service, October 1993.
- Guiding Principles of Sustainable Design. U.S. Department of the Interior, National Park Service, Denver Service Center, September 1993.
- Cultural Landscape Treatment Guidelines (*forthcoming NPS document*).



The General Management Plan Amendment has identified 13 planning areas in the Presidio. Each area has a distinct character that should be maintained. Within each planning area are subareas that may have important features of their own.


UNDERSTAND SIGNIFICANCE
• Work with the National Park Service to document historic and existing conditions.
• Identify critical site elements and relationships between them. Which elements and features, as outlined in these guidelines (natural systems, topography, views, spatial organization, circulation, vegetation, site furnishings, and objects) are sensitive to change?
• Are parts of the landscape later additions that are inconsistent with the historic character of the site?
• Refer to the General Management Plan Amendment and other documents to understand a site's history, its historical configuration and its intended future character.
• Understand the "spirit of the place" and the role of the site in the greater Presidio.
EVALUATE NEED FOR IMPROVEMENTS
• Does the landscape need upgrading and improvements?
• Is present use or occupancy of the building and site proposed to be changed?
• Determine code and other requirements. Are they addressed in an unsatisfactory way?
ASSESS IMPACT
• Determine the effect of code and other requirements on the landscape. Are new elements necessary?
• Work with the National Park Service to apply alternative codes and to develop a historic preservation approach and treatment plan.
• Be aware of potential archeological and biological resources on the site. If any exist, proceed with caution under the supervision of the National Park Service.
• Identify the planning area and subarea. Is the site part of a larger spatial system? Consult with the National Park Service.
IDENTIFY ALTERNATIVES
• Recognize opportunities and restrictions in site design at the Presidio.
• Can the integrity of the property be enhanced through restoration or rehabilitation?
IDENTIFY PREFERRED SCHEME AND PROCEED WITH WORK
• Comply with health and safety code requirements such as fire and barrier-free access, in a way that preserves character-defining spaces, features, and materials.
• Protect and maintain existing features and materials.
• Repair deteriorated historic or compatible features.
• Replace in kind parts of features that are too deteriorated to repair.
• Remove incompatible non historic elements.
• Replace in kind missing elements when adjacent to existing historic features of the same type.
• Design new elements, if necessary, to be contemporary in style and recognizable as new elements, but compatible with the historic landscape.
• Interpret the site as a restoration or reconstruction of a period of significance or as a newly altered landscape when appropriate to aid the public's understanding.
EVALUATE MAINTENANCE NEEDS
• Has the landscape suffered from deferred maintenance?
• Does the site have significant features that should be maintained?
DEVELOP A MAINTENANCE PLAN
• Coordinate maintenance with site improvements.
• Maintain historic features and materials.
• Determine responsibilities for maintenance of the site. This includes protection during construction and a long-term program for ongoing maintenance.

Building Site



Elise Hillend

Ten rare plant communities that have disappeared in the rest of San Francisco survive within the Presidio. The Raven's manzanita, illustrated above, is a particularly rare plant, which has been saved from extinction through the Park Service's plant propagation program.

Historic drainage systems are still in place beside historic buildings, roadways, and paths throughout the Presidio. They should always be considered before a new system is installed, and they should be rehabilitated for current use where possible, and maintained in place even if they have been superseded by newer drainage systems.

Natural Systems

Natural systems (water, geology, climate, and plant and animal habitats) at the Presidio are for the most part under National Park Service jurisdiction. However, tenants should consider the impact proposed changes could have on the interdependent natural systems. As the surrounding areas have become more densely urban, the Presidio has provided critical refuge for plants and wildlife which are susceptible to disturbances caused by changes in the landscape.

Recommended

Identify the natural systems of the site. Consult existing National Park Service inventories that identify rare or endangered species, unique or natural communities, or other environmentally sensitive resources and systems at the Presidio.

Evaluate existing or potential threats to natural resources before undertaking any work.

Protect the subsurface geological and hydrological systems of the property, and if feasible, reestablish "lost" hydrological or geological features that have been covered over.

Protect natural drainage areas, swales, and streams.

Minimize human access to and development of sensitive species' habitats.

Provide boardwalks or alternative designs to protect sensitive areas such as sand dunes from heavy public use.

Not Recommended

Protecting one landscape feature or system without considering the effect on others; for example, installing barriers that control one natural system, but that cause damage to other landscape elements.

Introducing into environmentally sensitive areas new construction or intensive uses that cause an adverse effect on important natural features such as wildlife.

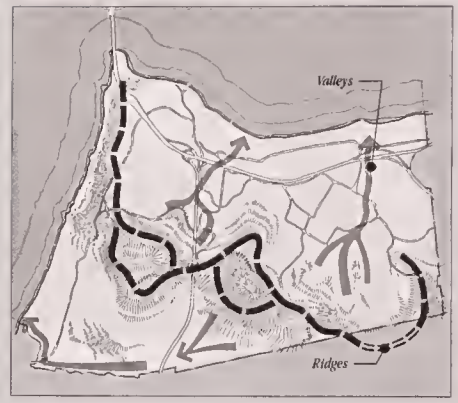
Allowing heavy equipment, debris, contaminated runoff, or other activities to damage sensitive natural areas and water bodies.

Disturbing the ecological balance by insensitive grading, digging, plant collecting, or introducing inappropriate vegetation for climate control.

Locating and constructing new additions or site features in a way that adversely affects natural systems.

Topography

Topography is the shape of both naturally occurring and altered landforms. A narrow strip of relatively flat land runs along the shore at the Presidio. For the most part, the rest of the site is moderately hilly, although steep cliffs rise abruptly from the beach in some areas. Most of the built environment at the Presidio is laid out to conform with the natural topography, rather than regraded to accommodate a formal site plan. Site topographical alteration has been limited to road construction and the filling of some wetlands and stream beds. Because the site slopes, unstable soils, drainage and erosion can be significant problems. Areas of uncompacted fill as well as naturally occurring areas of unstable soils can also lead to problems during seismic activity.



Courtesy Presidio GMPA

Landform: ridges and valleys

Ridges - - - -

Valleys ——→

Recommended

Identify historic and existing conditions and immediate or potential threats to the stability of the topography.

Identify and protect known and potential subsurface archeological features and artifacts.

Arrest conditions that contribute to topographical instablity in a manner that retains the historic character of the property. For example, provide adequate drainage access and erosion control so that landforms do not erode.

Preserve the natural and designed grades. Reinforce an eroded or unstable bank.

Design new features such as paths and regraded ramps, if required, in a manner that is unobtrusive and preserves the historic character of the topography.

Not Recommended

Stabilizing in a manner that alters the historic character of the topography.

Constructing new additions in a manner that severely alters the historic grade, such as radically changing the topography by major cutting and filling.

Regrading the site to provide new circulation or access when it is not compatible with the historic character of the topography.

Radically altering the spatial character of the topography, such as changing the character of a slope through terraced garden development.

Failing to maintain drainage systems and provide new ones such that erosion or damage to landforms results.

Regrading for road improvements necessitated modification of the building entrance and adjacent site (as shown above). The work was poorly planned and executed, resulting in loss of the historic character of the building and the site and contributing to the physical deterioration of the property. Changes in grade affect drainage and circulation patterns and must be carefully planned.

Building Site

The Presidio consists primarily of hilly terrain which provides vantage points for views of the built landscape below and distant vistas of the bay, city, headlands and islands beyond. Visual connections are an important aspect of the Presidio's character and should be maintained.

Historic pedestrian connections between different levels of the hilly site are common at the Presidio and will be restored to encourage pedestrian use. Stairs were often sited to focus on the entry to a building, with vegetation reinforcing the axial view. Site additions such as new plantings, signs, or objects that would block distant or close-range historic focal points should be avoided.

Views

Much of the Presidio was laid out with buildings and roads oriented toward important geographical focal points, such as the bay islands and the headlands. Presidio buildings, and especially their entrances, and smaller elements such as flag poles, can also be important close-range focal points or frame distant views. It is important to retain the established sight lines within the Presidio and the visual connections that have evolved between the city, the bay, the headlands and islands, and the Presidio.

Recommended

Identify the property's historic and existing views, both distant and close-range, and landscape features associated with them. Ensure their retention and the retention of their historical relationship to each other.

Protect and maintain features that define or frame important views. Design and site new construction to preserve these features.

Retain historic views through the control or removal of invasive or volunteer plant materials or by pruning overgrown vegetation that obscures the historic view.

Enhance views, especially historic views, by removing nonhistoric site elements.

Not Recommended

Allowing historic vistas to be altered or lost through incompatible development or inadequate control of invasive plant material.

Locating new additions (architectural or landscape interventions) in areas that block views important to the historic character of the landscape.

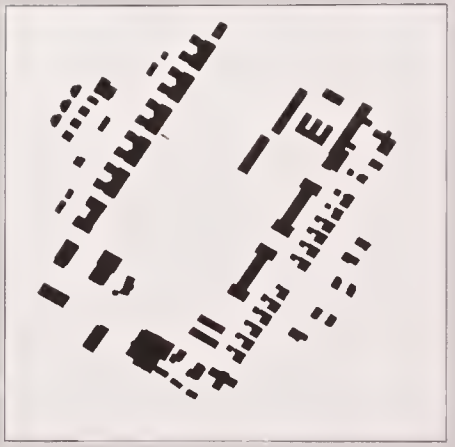
Altering visual connections that are important to the spatial character of the landscape by removing key elements, screening important views, or constructing visual barriers.

Exposing nonhistoric views through destruction of significant plant material.

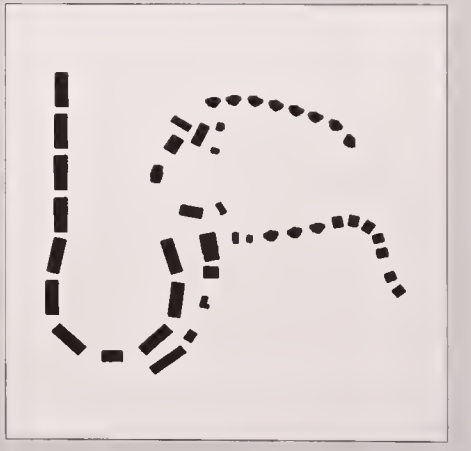
Changing the visual orientation or directional axis of an area or viewshed.

Spatial Organization

The relationship of elements of the landscape to one another and to the topography, establish the three-dimensional organizational patterns of a site. The placement of buildings, building clusters, plant material, and site objects helps to create distinct enclosures or outdoor rooms that may be visually or functionally linked to other spaces, and create spatial sequences much like the rooms in a house. At the Presidio some of these organizational patterns evolved for visual purposes while others were developed for functional reasons. The traditional military organizational pattern, which is evident at the main post, is axial, with straight streets and paths, and buildings and vegetation aligned in regularly spaced rows. Fort Scott, and many of the Presidio's residential streets, are laid out to follow the curving contours of the topography, representing a break from the traditional linear arrangement.



The main post



Fort Scott

While both the main post and Fort Scott were located specifically to take advantage of views of the bay, the two posts use different spatial layouts to accomplish this goal. Unlike traditional military posts, including the main post, that are built on an axial plan, Fort Scott was designed to fit the topography.

Recommended

Identify the historical spatial relationships and related features and materials as part of an overall site analysis prior to undertaking physical work, particularly with regard to building clusters or groups.

Identify features and materials that constitute the spatial relationships of the landscape, and protect them from alteration or loss.

Retain important visual connections between spaces or "outdoor rooms" within the landscape by maintaining vegetation, roads, paths, and topography which define these visual relationships.

Reestablish vanished spatial relationships by replacing the components that historically shaped the landscape spaces. For example, replace a missing row of trees or a section of a fence.

Not Recommended

Removing, moving, or altering features that define the spaces in the landscape, such that the historic spatial relationship between features is changed.

Changing existing or creating new spatial divisions of the landscape that contribute to its historic character, such as topographic changes or vertical and horizontal elements such as vegetation features, fences, or walls.

Placing or designing new additions in a way that affects the spatial relationships of the landscape, such as locating new construction in a character-defining open space.

Building Site

Distinctive streetscapes are characteristic of much of the Presidio housing, which was designed to respond to the topography. The road parallels the natural contour and the similarly designed houses follow the curving road with a uniform setback. A stone retaining wall and regularly spaced trees define the edge of the road, and trees overhanging the roadway create a "ceiling."

Shown above is a vivid example of how an overscaled or elevated roadway can adversely affect the historic character of a site.

Circulation

The circulation system is often a primary organizing element of a site. At the Presidio, the circulation pattern tends to change with the topography of the site; the flatter parts of the site, such as the main post or Letterman complex, tend to be organized axially, following traditional military planning, while the steeper areas are laid out following the topographical contours. The organizational pattern as well as grade, width of road or path, edge condition, and paving material all contribute to the character of a circulation system. Circulation, both vehicular and pedestrian, is a sequential experience that includes procession through the site, approach, arrival, and entry.

The National Park Service will encourage pedestrian and bicycle circulation, promote public transit, and limit vehicular access at the Presidio. The current circulation systems will undoubtedly change, but any modification should respect historically established road corridors and the existing hierarchy between the various roads and paths.

Recommended

Identify and preserve the hierarchy of circulation paths. Primary and secondary routes each have their own character-defining features.

Identify and preserve the experiential nature of a circulation system, i.e., the sequence of approach, arrival, and entry. Any new design that changes the historic circulation system, such as provision of barrier-free access, should preserve the historic character of the sequential experience.

Identify related features—such as bridges, retaining walls, fences, hedges, rocks, borders, light fixtures, guardrails, curbs, gutters, and ditches— that define, enclose, or support historic roads and paths and therefore contribute to the character of the circulation system.

Not Recommended

Neglecting historic circulation patterns in planning building activities or new landscaping over historic paths.

Removing or paving over historic edge materials or adding additional height or thickness of paving that alters the relationship between the road surface and edge materials.

Patching with materials that do not match the historic surface, such as repairing a brick walk with asphalt.

Neglecting historic circulation patterns in planning new routes rather than reusing or modifying historic paths; e.g., providing barrier-free access by removing or paving over steps in a historic path, or by insensitively regrading a character-defining slope.

Recommended

Limit introduction of new paths and access points such as curb cuts and driveways. Reuse, reestablish, and restore character-defining circulation routes and features as the landscape is upgraded for contemporary use. Follow historic and established trails in providing paths between areas where sensitive resources are not affected.

Control use on historic roads and paths so that damage is minimized to historic materials or features such as paving.

Protect the remnants of partially lost historic circulation features for their archeological value.

Retain the historic spatial and functional relationship of the road corridor by maintaining the massing of adjacent vegetation (such as street trees), topographical features, vistas, or other associated features.

Protect the historic roads or paths from erosion by providing adequate drainage and keeping the systems in good working order. Retain the historic drainage systems adjacent to roads and paths even when these have been superseded by more modern drainage systems.

Retain historic edge features during resurfacing by maintaining the historic finish elevation of the road or grade of the path.

Not Recommended

Paving over a historic path with a new, incompatible material instead of preserving its historical character.

Painting pavement, except to define parking or traffic requirements.

Upgrading historic roads and paths to modern standards by removing historic features such as coping stones, drainage systems, and surface materials.

Adding new roads, paths, or parking areas when historic ones could be used.

Adding additional height or thickness of paving that alters the relationship between road surface and edge materials.

Over time, much of the Presidio has been paved to accommodate automobiles. The General Management Plan Amendment for the Presidio calls for a substantial reduction in paved areas to decrease uncontrolled traffic movement. Native vegetation will be restored in these areas wherever possible.

The unpaved road and site surrounding the cavalry stables evokes an era when horses and mules were a vital element at the Presidio. Paving such areas would compromise the historic character of the site.

Building Site

Courtesy Presidio Museum, GGNRA, NPS

Lovers Lane, which links the main post to the Presidio gate at the southeast entrance to the park, was once a formal boardwalk (above) but is now a paved path (below). This is an example of lost historic fabric.

Recommended

Analyze existing paving and establish its historical significance in consultation with the National Park Service. In some cases paving is a later, nonhistoric addition, compromising the character of a site.

Retain historic surface materials. Repair existing materials whenever possible. If replacement is necessary, replacement material should be compatible in color, texture, composition, and scale. Some historic surface materials and site features are buried below later surface materials. These should be exposed when feasible.

Provide the highest level of barrier-free access to the historic landscape with the lowest level of impact by carefully selecting areas where the least alteration to historic features and materials is required. Study a range of alternatives in order to provide access while minimizing any adverse impacts.

Work with the National Park Service to determine alternative measures available under some codes so that alterations or additions to the historic landscape can be avoided.

Convert historic road corridors to pedestrian and bicycle use when simplifying the automobile road networks.

The historic brick foot bridge (above) is located where Lovers Lane crosses Tennessee Hollow. Elements such as bridges, retaining walls, and curbs contribute to the character of a circulation system and should be protected. These elements are often jeopardized when roads or paths are resurfaced or widened.

Vegetation

In general, vegetation at the Presidio is characterized as sparse, requiring low-maintenance and relatively little water. Planting around the buildings, where it occurs, is manicured and contrasts with mature forests seen as background. The dynamic nature of plant materials must be recognized; vegetation requires ongoing maintenance and management. A site maintenance master plan—including a component addressing both cyclical and long-term maintenance needs such as periodic replacement of diseased, deteriorated, dying, or overscaled vegetation—should direct all site work. Overgrown vegetation can obscure important sight lines. Most of the overgrown gardens and landscape features will be restored to their original formal appearance. Plant materials should be selected for historical accuracy, sustainable considerations such as irrigation and maintenance needs, and life span. It is important to recognize whether a plant species has any historical associations, horticultural or genetic value, and whether it provides animal habitat.

Vegetation around and particularly in front of buildings at the Presidio is usually characterized by manicured, low planting that allows a clear view of the building from the street and clear sight lines from the building to distant views. Vegetation should be pruned regularly to maintain the historic sight lines. The area shown above has not been well maintained. Overgrown vegetation obscures the focal point of the building entry. It also creates a hazard for pedestrians and may lead to the deterioration of the stairs.

Recommended

Research the history of the landscape as a whole, and in particular, the history, location, species, and character of the vegetation, and its relation to other landscape features such as spatial organization.

Identify, protect, restore, and enhance native plant habitat. All planning must take into account the potential presence of rare and endangered species and possible habitat enhancement opportunities.

Identify and retain the historic, character-defining form, arrangement, and species of vegetation through regular and cyclical maintenance. For example, maintain the appropriate height and shape of foundation planting through pruning or removing volunteer or invasive plant material.

Not Recommended

Allowing vegetation to grow beyond its intended design scale such that it alters the character of the landscape.

Pruning a tree excessively and without regard for its health or shape, particularly when trimming to retain or secure a view.

Replacing a deteriorating vegetation feature with inappropriate plant material such that an inaccurate historic appearance or inconsistent design is conveyed.

Introducing an incompatible new vegetation feature, such as planting annuals where they were never used historically so that, as a result, an inaccurate historic appearance is presented.

Building Site

Traditional military designs favored regular, linear arrangements. However, these replacement trees were planted in an alternative location, when the original location within the planting strip was both suitable and useable. These replacement plantings also block a character defining vista out to the bay.

Recommended

Control pedestrian traffic across planted areas by providing appropriate barriers or alternative pedestrian routes to minimize deterioration of plant material.

Protect vegetation from damage or destruction from adjacent activities, especially construction. Protect root systems below ground from grading or soil compaction.

Replace vegetation, when necessary, with suitable plant material that replicates the design intent and function of the historic vegetation feature. This may require replacement with the same genetic stock material.

Replace vegetation with mature stock whenever feasible in order to maintain uniformity with neighboring trees and shrubs.

Evaluate the condition of vegetation to determine appropriate maintenance practices such as pruning, integrated pest management practices, or environmentally sensitive fertilization.

Identify and investigate historic methods of vegetation maintenance, such as hand pruning or hand watering, and consider them where appropriate.

Not Recommended

Replanting replacement trees in an alternative location when the original location is usable.

Planting new vegetation in a character-defining vista, open field, or lawn, such that the historic character of the site is diminished.

Adding new vegetation that would not have existed historically, such as window planters or vegetable gardens, which intrude on the character of the setting.

Selecting a restoration period for the landscape and its vegetation features that presents a time frame that is different than its associated historic resources, or conversely, restoring a building to a different period than the landscape.

Planting screening vegetation too close to utility structures, thereby diminishing access.

Locating replacement trees in a historic location that is environmentally unsuitable so that damage occurs to the trees or nearby structures.

Installing new sprinkler systems without consulting with the National Park Service.

Recommended

Consider adding vegetation features to screen visually intrusive, nonhistoric elements or new construction. New vegetation features need to be compatible with the historic character of the landscape.

Plant replacement trees in an alternative location when the historic trees are missing and the original location is technically or environmentally unsuitable. For example, plant a replacement tree farther away from the historic building if the original location caused damage to the structure. The new location should be as close as possible to the original, however, and should preserve the relationship between the planting and the built elements. For example, if planting existed where a new barrier-free access is installed, place similar plant materials along the side of the new ramp.

Use water-conserving measures when irrigating the landscape: use reclaimed water, minimize evaporation from wind and sun by watering at appropriate times of day, and use the most effective watering technique.

The Presidio's historic forest, planted on the ridges by the Army in the late 19th century, and an alley of mature cypress trees define the edges of the historic path above. The trees are important character-defining elements, but are approaching the end of their life span and will have to be replaced. Replacement trees should be of the same species and located in the same positions.

In some situations, elements that divide the landscape along historically established boundaries are acceptable. However, they should be low or transparent so as not to change the perception of a site. In the example above, the fence and hedge are low enough that they do not obscure the views between buildings, yet they physically establish the boundaries between properties. The hedge softens the appearance of the chain link fence and improves its screening capacity.

The L-shaped plan of the historic residence above forms an "outdoor room," at the rear, shielded against the prevailing wind. Site furnishings such as picnic tables, barbecues, and clotheslines, may be appropriate in such private spaces but should be moveable (as opposed to permanently installed). Storing such items indoors when they are not in use avoids general site clutter.

Site Furnishings and Objects

Small-scale elements in the landscape—furnishings and objects such as benches, lights, signs, transformers, drinking fountains, trash receptacles, fences, flagpoles, art, monuments, memorials, planters, and picnic tables—may be functional, decorative, or both. They may be movable, seasonal, or permanently installed. Historically, site furnishings and objects at the Presidio tended to be utilitarian rather than decorative and their number was kept to a minimum. The Presidio is a national historic landmark whose buildings and landscape are highly sensitive to change. Future introductions of objects, including artwork, into the landscape will therefore have to be compatible with the historic setting. Any additions should be installed in a manner that allows future removal without damage to the historic fabric.

Recommended

Identify historic and compatible site furnishings and objects and their materials and establish maintenance guidelines for protecting them in place from vandalism, environmental factors, or future site work.

Repair deteriorated parts of historic site furnishings and objects through limited replacement in kind. If using historic materials is not feasible, substitute materials may be used if they have the same appearance.

Install new site furnishings and objects, if necessary for the new use, as long as their design, placement, color, and quantity do not alter the character of the landscape.

Not Recommended

Failing to identify, evaluate, and treat the cumulative effects of moisture and wind, such that site furnishings and objects are damaged or lost.

Adding new features such as planters or window boxes that intrude on the character of the setting.

Introducing new site furnishings or objects such as artwork or memorials that diminish the historic character of the Presidio landscape, which is highly sensitive to change.

Illuminating landscape or architectural features that were never lit historically.

Building Site

Recommended

Maintain consistency in lighting design throughout a building cluster. Follow criteria developed by the National Park Service for lighting color, glare, direction, and spread.

Preserve historic lighting and keep added site lighting to the minimum necessary. When added lighting is necessary for security or safety, it should be provided by additional contemporary light standards that are compatible with the historic character of the site, but distinguishable from the existing historic fixtures.

Maintain discreet and minimal use of signage through message brevity. All tenant signage will be subject to the approval of the National Park Service. Signage should be removable and compatible with the architecture of the building and any existing historical signage, but distinguishable from it.

Review the introduction of any new elements with the National Park Service to ensure compatibility with Presidio design details and other nearby elements. New elements should be visually subordinate to the historic elements and should be made of environmentally sound materials.

Not Recommended

Adding historic-looking or reproduction-design furnishings such as lights and benches that never existed in the landscape.

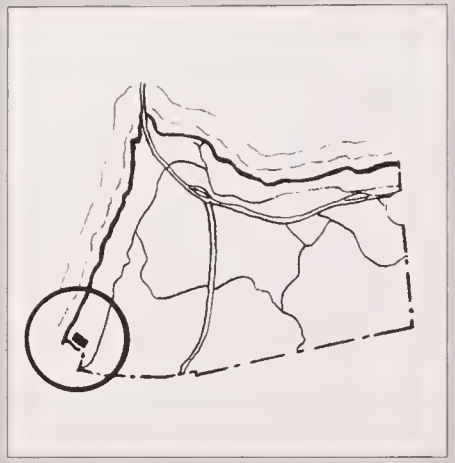
Introducing new elements such as street lights that are incompatible in size, scale, form, shape, material, and color.

Site furniture, such as benches, trash receptacles, picnic tables, and bicycle racks, should be carefully considered to ensure it is compatible in style, color, number, and size with the surrounding architecture and site. The placement, size, and design of the trash receptacle above make it an inappropriate choice for this location.

Site objects having both aesthetic and functional purposes can be found throughout the Presidio. This decorative cast stone urn also functions as a street sign for Simonds Loop. Such objects should be identified and maintained in place. If they function as focal points in the landscape, views toward them should be kept clear.

Case Study

The Presidio Water Treatment Plant is a cluster of historically significant buildings and structures located on an exposed shoreline site near the mouth of Lobos Creek, at the southwestern corner of the Presidio. The creek is the main freshwater source at the Presidio and has supplied its water for over a hundred years. The Water Treatment Plant, built in 1911, allowed the Army post to be self-sufficient—no longer reliant on municipal sources of water. The building group and the surrounding landscape are perceived as a whole—any action must be considered from the point of view of how it will affect the entire ensemble.



The rehabilitation of buildings, structures, and site of the Water Treatment Plant was commissioned by the National Park Service, who will also administer the day-to-day operations of the facility. The plant is a specialized, utilitarian complex that will be inaccessible to the general public and is therefore unlike most of the leasable properties for which the Rehabilitation Guidelines are written. However, the Water Treatment Plant project illustrates the recommended design process applicable to most Presidio properties in future site improvement and rehabilitation projects. The process follows the chart presented earlier in this chapter and consists of three phases: Evaluate Need for Landscape Improvements and Assess Character of the Site, Research and Plan, and Proceed with Work.

Perhaps because of the utilitarian nature of the complex, the site has had minimal maintenance and care in the past. In general, the site has retained its overall historic character, and is dominated by the gently sloping dune environment and flat open spaces created by several underground tanks. The principal additions to the complex that impact the site are tank covers and fences added for safety, paving, and some small structures added to the facility to upgrade the treatment system.

The Water Treatment Plant will be upgraded by the National Park Service to provide potable water for the Presidio. As part of this work (due to code and functional requirements), improvements to the building, equipment, and site will be undertaken. Code issues may require future site alterations or additions, including the following: accessible building entrances, fire access to site, seismic stabilization of subsoils, and new safety equipment requiring either exterior controls or the construction of new buildings or additions. Some of these may have major adverse impacts on one or more features of the site and may warrant consideration of alternative solutions by the National Park Service. Balancing the significant elements of the site with its functional requirements is the goal of all proposed work. Following the order of the subchapters within the "Building Site" Chapter of these guidelines, sensitive issues at the Water Treatment Plant include:

Case Study

NATURAL SYSTEMS

EVALUATE NEED FOR LANDSCAPE IMPROVEMENTS AND ASSESS CHARACTER OF THE SITE

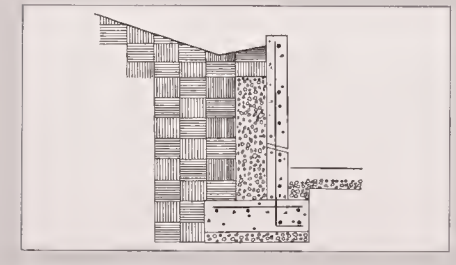
- Lobos Creek remains the primary freshwater source for the Presidio but upgrading is necessary for health, safety, and improved operations of the water supply system.
- The Water Treatment Plant site and the adjacent creek bed are home to both rare and endangered plant communities and are a rich animal habitat.
- The Water Treatment Plant is a potential source of contamination to both plant and animal communities and groundwater system.

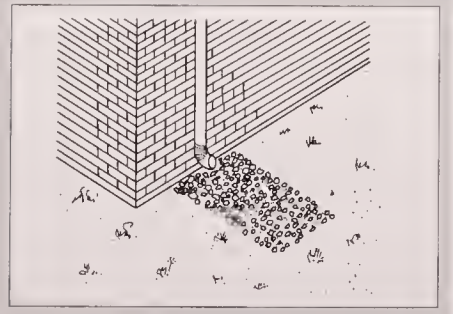
RESEARCH AND PLAN

- Preserve and restore rare or endangered communities. Areas currently covered by ice plant or other nonnative species can be replanted with appropriate native foredune and shrub communities.
- Large asphalt areas create runoff problems and potential erosion of soils and deterioration of plants and animal habitat. Consider removing unnecessary, noncontributing paving.

PROCEED WITH WORK

- Some retaining walls will be necessary. Ground behind the wall should be shaped as shown to create a swale and facilitate proper drainage. Retaining walls and swales will be used to divert storm runoff away from structures. *Site map figure 1*
- Where the soil is easily eroded, especially in the areas of sandy soils, a gravel bed will be specified under the downspout to control erosion. *Site map figure 2*
- In areas where there is a high potential for soil liquefaction during earthquakes, the soil condition will be improved by compaction grouting under and around the perimeter of critical structures. This will reduce the potential for structural damage in the event of an earthquake. *Site map figure 3*





EVALUATE NEED FOR LANDSCAPE IMPROVEMENTS AND ASSESS CHARACTER OF THE SITE

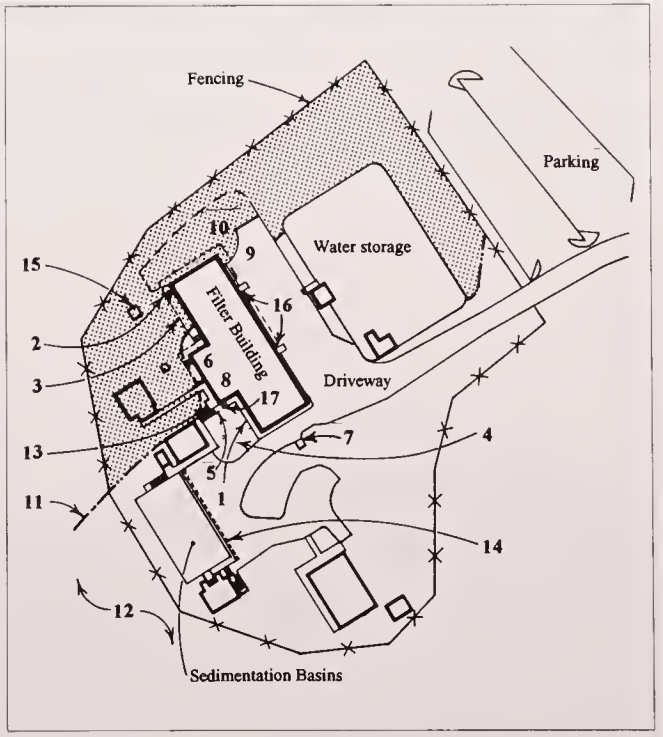
- The soil on the site is sandy and subject to both erosion and possible liquefaction during major seismic movement. These risks need to be reduced.
- Because of its location near the ocean and the mouth of Lobos Creek (the primary fresh water source for the Presidio), the site's potential for prehistoric and historic archeological resources is high.

RESEARCH AND PLAN

- Control surface and building drainage.
- Reinforce seismic stability of the soils.
- Be aware of archeological potential during all excavation on site during new construction, building stabilization, parking, or planting alterations.
- Avoid any significant alteration of grade during new construction.

PROCEED WITH WORK

- Regrading will be kept to a minimum but there will be some site work to provide positive drainage at the Filter Building. *Site map figure 4*
- New retaining walls and steps will be added only where necessary, such as at the south and west of the Filter Building to improve site drainage. *Site map figure 5*



PRESIDIO WATER TREATMENT PLANT

PROPOSED SITE PLAN

Not to scale

Site Plan call-outs are referenced on pages 20 - 26

Case Study

VIEWS

EVALUATE NEED FOR LANDSCAPE IMPROVEMENTS AND ASSESS CHARACTER OF THE SITE

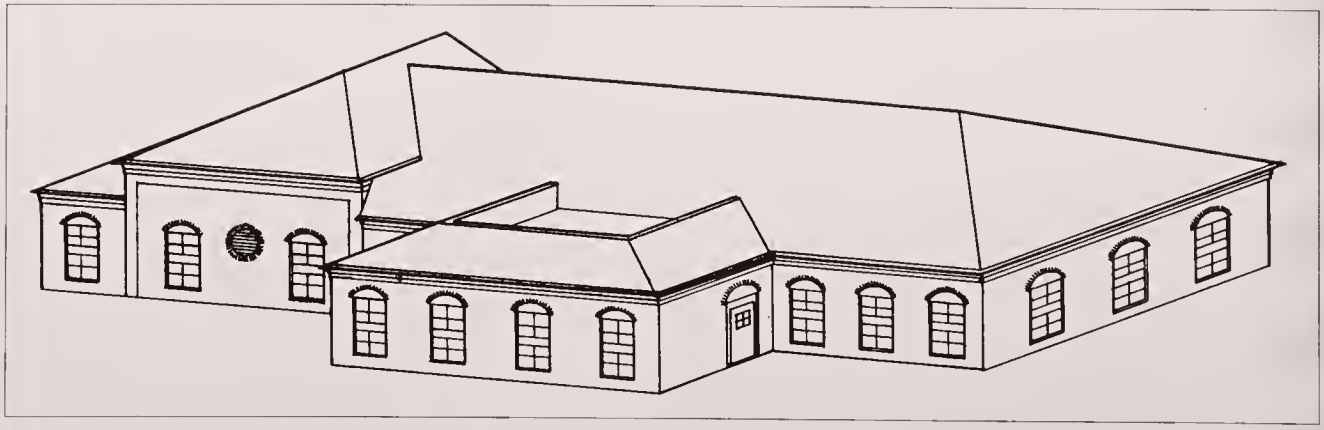
- The site has spectacular views of the Marin Headlands, the Pacific Ocean and the Golden Gate Bridge that need to be preserved.
- The complex is visible from adjacent residential neighborhoods and roadways.

RESEARCH AND PLAN

- Avoid new construction that may adversely impact views of the site and from the site. Determine major vistas and view corridors and locate any new construction or exterior equipment so as not to intrude.
- Both existing and proposed safety fencing may impact views. Consider best locations and materials. Utilize plant screening where appropriate. Remove unnecessary fencing.

PROCEED WITH WORK

- A new addition will replace an inadequate, nonhistoric shed structure at the back of the Filter Building. The new structure will be sited in the same location with a slightly larger footprint than the removed shed, but will still be visually subordinate to the main building. Located in the back, the addition is not visible from the road as one approaches the site. The roof is low so that historical views toward the site and from the site are preserved. Necessary mechanical equipment will be partially screened by the mansard and will be painted a color that blends with the rest of the roof to minimize the visual impact. *Site map figure 6*



EVALUATE NEED FOR LANDSCAPE IMPROVEMENTS AND ASSESS CHARACTER OF THE SITE

- As a utilitarian facility, the Water Treatment Plant was organized on a functional rather than formal basis. As the site retains its function, the character-defining layout will remain virtually unchanged.
- The relationship of the principal buildings to the open areas gives the site its spatial character.

RESEARCH AND PLAN

- Determine historic spatial organization and attempt to enhance it when new construction is required.
- Locate any new construction to retain the relationship among buildings in the cluster and between buildings and open areas.

PROCEED WITH WORK

- The open character of the site will be retained. Noncontributing temporary structures (such as a corrugated metal shed) will be removed. *Site map figure 7*
- The spatial relationship among the buildings will be unchanged by the location of the new addition. *Site map figure 8*

Case Study

CIRCULATION

EVALUATE NEED FOR LANDSCAPE IMPROVEMENTS AND ASSESS CHARACTER OF THE SITE

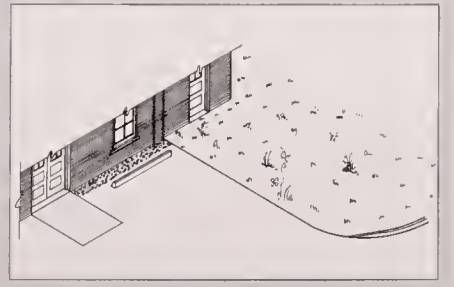
- The utilitarian character of the site means paving often abuts the buildings.
- The experiential sequence of the circulation system is a character-defining historic element.
- Large areas of asphalt paving have been added, affecting surface drainage, causing deterioration of building materials, and impacting plant communities and animal habitats.

RESEARCH AND PLAN

- Compliance with regulations and codes will be required.
- Maintain historic access to the site. Where building access is changed retain historic entrances. Maintain historic circulation pattern and sequence of approach and entry.
- Remove unneeded parking areas and develop parking areas that allow retention of historic circulation systems.
- Demarcate pedestrian circulation among structures to minimize erosion and damage to plant materials.

PROCEED WITH WORK

- Nonsignificant and superfluous asphalt paving will be removed and native vegetation will be reintroduced on the side of the Filter Building facing the dunes. Due to the programmatic changes in the interior, the use of the door on the right will be abandoned. A strip of sand-colored gravel will separate the building from the asphalt paving, preserving the masonry and alluding to the natural context of the original site. Recycled wheel stops will replace striped bollards. Concrete pads will define the entrances and facilitate maintenance. A raised curb at the edge of the asphalt will occur only where necessary for safety, such as at the turnaround. In general, where possible, it is advisable to provide parking away from the principal facade of a building. In the case of the Filter Building, it was decided that the paving in front was a part of the cultural landscape and should remain. Such adaptations of ideal designs are inevitable on a historically significant site. *Site map figure 9*



EVALUATE NEED FOR LANDSCAPE IMPROVEMENTS AND ASSESS CHARACTER OF THE SITE

- Nonnative plants such as ice plant dominate vegetation on the site. As per the *Presidio General Management Plan Amendment* the nonnative plants are to be replaced with native communities wherever possible.
- The Water Treatment Plant site straddles two native plant communities: the sparsely planted northern foredune community and the native shrub community.
- The buildings do not have decorative planting at their bases.

RESEARCH AND PLAN

- Remove invasive nonnative plants.
- Do not add decorative planting or other vegetation that is out of character with the site.
- Utilize drought tolerant plants appropriate for foredune and shrub communities.
- Protect planting during any construction projects.
- Develop sustainable watering methods.

PROCEED WITH WORK

- Asphalt will be removed and dune vegetation will be restored in this area. Where damage occurs due to construction it is strongly recommended that those areas be restored to native plant community. *Site map figure 10*
- The line indicates the division between the northern foredune restoration area and the shrub community restoration area. *Site map figure 11*
- The nonnative invasive ice plant at the creek bed will be removed and replaced with native vegetation. *Site map figure 12*

Case Study

SITE FURNISHINGS & OBJECTS

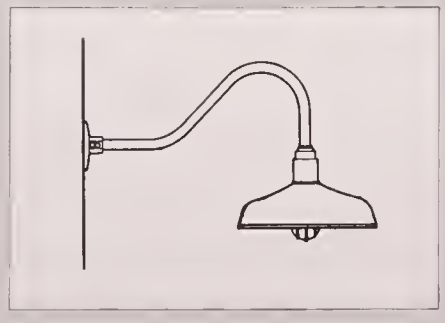
EVALUATE NEED FOR LANDSCAPE IMPROVEMENTS AND ASSESS CHARACTER OF THE SITE

- All site furnishings and objects are utilitarian.
- Elements such as fences around the complex are necessary for security and were not there historically. Fencing within the complex is not needed.

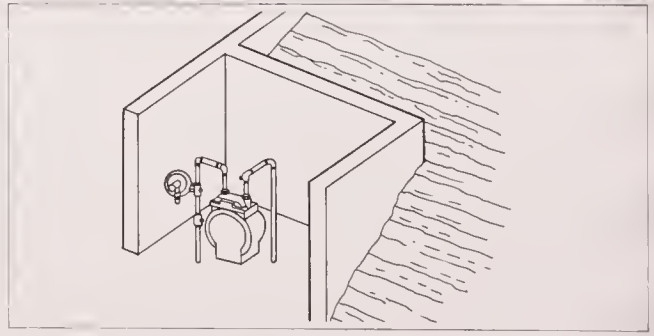
RESEARCH AND PLAN

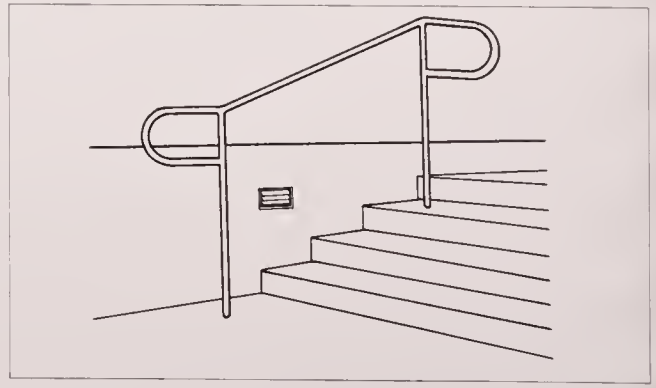
- Because of the utilitarian character of the site it may be appropriate to locate some structures or equipment in visible exterior locations, but these should not intrude on views or spatial relationships.
- Replace inappropriate lighting.
- Do not add decorative features (planters, signs, benches) that are out of character with the site.
- Both existing and proposed safety fencing may impact views. Consider best locations and utilize plant screening where appropriate. Remove unnecessary fencing.

PROCEED WITH WORK



- To minimize visual intrusion, an exterior gas meter will be located in a niche created by the retaining wall. *Site map figure 13*
- Fencing, when no longer necessary, will be removed. *Site map figure 14*
- Small mechanical elements will be painted to minimize their visual impact and blend into the surrounding environment. *Site map figure 15*
- New light fixtures that direct light downward will be mounted on either side of both doors. They will replace glaring "wall-pack" lamps. Often site lighting can be achieved by utilizing the building itself as is the case here. This approach and the design described below favor "task lighting" important elements instead of flood lighting the whole site. *Site map figure 16*
- Small louver lights that project light downward to illuminate only the steps will be placed in the retaining wall. A code-compliant railing will be added. *Site map figure 17*





Unit Masonry

ADOBE

BRICK

HOLLOW CLAY TILE

STONE

TERRA COTTA

MORTAR

Unit Masonry

ADOBE

BRICK

HOLLOW CLAY TILE

STONE

TERRA COTTA

MORTAR

The longevity and appearance of a masonry wall are dependent on the size of the individual units and the mortar.

Stone is one of the more lasting of masonry building materials and has been used throughout the history of American building construction. The stone most commonly encountered on historic buildings in the United States includes various types of sandstone, limestone, marble, granite, slate, and fieldstone. Brick varied considerably in size and quality. Before 1870, brick clays were pressed into molds and were often unevenly fired. The quality of brick depended on the type of clay available and the brick-making techniques; by the 1870s—with the perfection of an extrusion process—bricks became more uniform and durable. Terra cotta is a kiln-dried clay product popular from the late 19th century until the 1930s. The development of steel-frame office buildings in the early 20th century contributed to the widespread use of architectural terra cotta. Adobe, which consists of sun-dried earthen bricks, was one of the earliest permanent building materials used in the United States, primarily in the Southwest.

Mortar is used to bond masonry units. Historic mortar was generally quite soft, consisting primarily of lime and sand with other additives. After 1880, portland cement was usually added, resulting in a more rigid and nonabsorbing mortar. Like historic mortar, early stucco coatings were also heavily lime-based, increasing in hardness with the addition of portland cement in the late 19th century. Concrete has a long history, being variously made of tabby, volcanic ash, and, later, of natural hydraulic cements. Since the introduction of portland cement in the 1870s, concrete has also been used in its precast form.

While masonry is among the most durable of historic building materials, it is also very susceptible to damage by improper maintenance or repair techniques and harsh or abrasive cleaning methods.

Historically, there are four types of unit masonry construction at the Presidio: adobe, stone, brick, and terra cotta, used alone and in combination. Only a fragment of the earliest masonry structures at the Presidio, simple adobe bricks laid in a mud mortar, remains above ground. A small portion of an early adobe wall is displayed behind glass, encased within the walls of the Officers' Club.

Unit Masonry

There were three early stone quarries on the Presidio (one on Rob Hill, one below Inspiration Point, and another near Lombard Gate), whose locations can still be detected by the uneven ground surface. The sandstone from these quarries was apparently not suitable as a building material and was primarily used for road improvements. Otherwise, stone was used only as foundation material for the 19th-century wood and brick buildings, or as trim for later brick buildings. An exception is the small 1863 powder magazine at the southeast corner of the main parade ground, which is a rare example at the Presidio of vaulted stone construction; the hipped roof was a later addition. Stone trim is almost exclusively a blue sandstone that appears in rock-faced coursed ashlar bases, or as belt courses and simple window trim. There is some tooling, but little carved detail. Slate was used for roofing on a few buildings and for some exterior sheathing. A variety of historic masonry retaining walls and sitework are found throughout the Presidio, including much of the original sandstone boundary walls and carved entrance pylons designed by architect J. B. Whittemore ca. 1894.

Brick is the most common unit masonry material at the Presidio; Fort Point, built in 1853 at the entry to the bay, established the stylistic precedent. The fort was constructed of a high-quality, hard-fired red brick manufactured on the site, because brick of sufficient quality was not commercially available in San Francisco. A local blue sandstone was used, with granite from China, for the foundation and simple trim. With few exceptions, Presidio brick is a machine-made, uniformly colored, dark-red brick, laid in a common bond. Notable exceptions are some of the officers' quarters, where brick is laid in a Flemish bond and is more varied in color.

Terra cotta is represented in two forms at the Presidio: as hollow clay tile (rough finished hollow building blocks) and as decorative glazed units. Hollow clay tile appears regularly in interior partition walls, but rarely in load-bearing or exterior walls. The ornate entry to the main post chapel is a noteworthy example of glazed terra cotta, a rare use of the material at the Presidio.

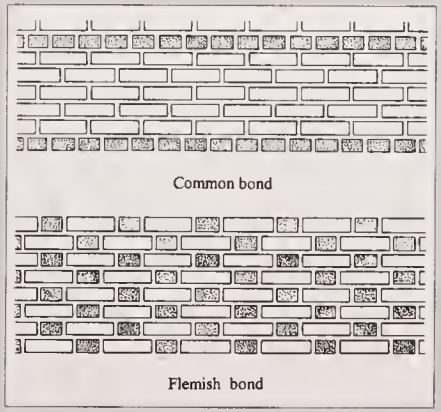
Materials and workmanship at the Presidio are generally of a higher quality than that typically found in local masonry construction of the same period. Some brick mortar was originally colored with a light-red mineral pigment. Mortar joints were generally flush in brickwork, but had a raised profile in sandstone masonry. Later repointing campaigns rarely matched the original mortar in composition, color, or tooling.

This historic photograph from the 1906 album of General Greely shows an officer's quarters constructed of adobe at the Presidio. The only adobe now evident at the Presidio is within the wall of the current Officers' Club.

A rare example of vaulted stone construction at the Presidio is the small 1863 powder magazine at the main parade ground.

Unit Masonry

Most of the brickwork found at the Presidio is laid in a common bond with a uniformly colored, dark-red brick. While decorative brickwork was not commonly used, examples can be found such as the corbelled and set-marked brick above.



Common bond has three or five courses of stretchers to one course of headers. In Flemish bond, headers and stretchers alternate in each course and the center of each header is directly above the center of the stretcher.

Because of the relatively mild temperatures of San Francisco, freeze-thaw cycles, which can be quite destructive to masonry, are not a serious problem at the Presidio. Exposure to soot and chemicals from industrial pollutants is minimal; however, the marine climate, bird debris, biological growth, and graffiti pose a constant threat to the masonry.

Unfortunately, some brick buildings at the Presidio have been cleaned by sandblasting. This inappropriate treatment stripped the brick of its dense, weather-resistant outer layer, and left it pitted and more moisture-permeable. Sandstone has spalled in many locations, though it remains crisp and durable elsewhere. This may be due to natural variations in the stone as well as some faulty original details that prevented proper drainage (such as lack of drip groove and inadequate slope of sill) or to later damaging alterations or inappropriate repairs.

Although most of the masonry units at the Presidio are uncoated as originally intended, some brick and much of the sandstone have been painted. Some masonry was covered with a layer of cement stucco at the time of construction to improve its water-shedding capacity and unify the building's appearance; the cement stucco covering Stillwell Hall masks the fact that the ground floor is reinforced concrete, while all the upper stories are brick construction.

The work required to clean masonry of accumulated paint or residue is considerable, and may have a significant impact on the surrounding environment. The consequences of any such work should be carefully evaluated in light of sustainable design. High-pressure water cleaning not only requires an enormous quantity of water, but may force water into the walls, damaging interior materials such as plaster or joist ends as well as any metal elements. Dry abrasive cleaning methods generate large amounts of dust, endangering equipment operators and the immediate environment, including unprotected plants and adjacent materials. Chemical cleaning products and herbicides used to control biological growth are also potentially harmful to the operator, to the masonry, and to the environment. They should be avoided whenever possible. Peel-away paint stripping products may be a possible solution, because they help prevent the dispersion of toxic materials and facilitate their removal from the immediate site.

Unit Masonry

Recommended

Identify, Retain, and Preserve

Identify, retain, and preserve masonry features that are important in defining the overall historic character of the building, such as walls, brackets, railing, cornices, window architraves, door pediments, steps, and columns, and details such as tooling and bonding patterns, coatings, and color.

Identify all masonry building materials, such as the type of stone and its corresponding mineral composition or manufacturing process, porosity, solubility, and hardness. Appropriate treatments will vary depending on these properties.

Identify, retain, and preserve mortar composition. This will require a mortar analysis to identify and match the original binder, aggregate, pigment, and strength.

Identify, retain, and preserve the original techniques for tooling stone and striking joints. Keep in mind that vertical and horizontal joints can vary.

Identify possible problem areas, such as locations of potential spalling due to corroded metal anchors, by carefully studying a building's construction.

Retain masonry chimneys in place, even if they no longer function. Chimneys contribute significantly to the historic character of a building.

Not Recommended

Removing or radically changing masonry features that are important in defining the overall historic character of the building such that the character is diminished.

Replacing or rebuilding a major portion of exterior masonry walls, which is essentially new construction, such that the building is no longer historic.

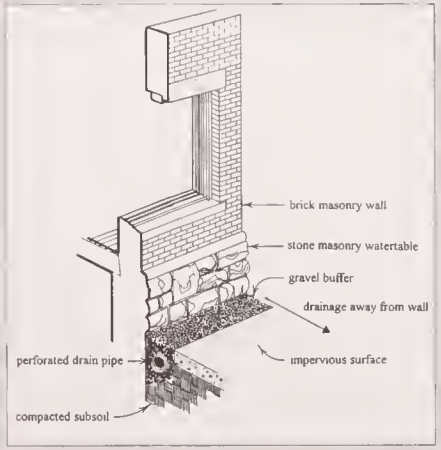
Applying paint or other coatings such as stucco to masonry that has historically been unpainted or uncoated to create a new appearance.

Removing paint from historically painted masonry.

Radically changing the type of paint or coating or its color.

Glazed terra cotta surrounds the entry of the main post chapel. Portions are covered with biological growth due in part to the condensation of moist air on the cool, relatively impervious, glazed surface. Biological growth can eventually damage the terra cotta and should be removed with water and a mild detergent. However, acidic cleaners are inappropriate because they will etch the glazed surface. There is a small plant that has taken root in the mortar joint. It should be removed and the joints repointed to prevent water from corroding the metal anchors that typically attach terra cotta to the structure.

Unit Masonry



An impervious surface in direct contact with a masonry wall can cause damage from backsplash and rising damp. This is a typical problem in places where asphalt paving has been added. The sketch above illustrates a solution that provides drainage from the walls and reduces rising damp. Other methods may include regrading or installing porous paving.

Recommended

Protect and Maintain

Protect and maintain masonry by providing proper drainage so that water does not stand on flat, horizontal surfaces or accumulate in curved decorative features. Water should be directed off masonry wherever possible.

Clean masonry only when necessary to halt deterioration or remove heavy soiling.

Conduct masonry surface cleaning tests if cleaning is appropriate. Tests should be observed over a sufficient period of time to assess both the immediate and the long-range effects of cleaning.

Clean masonry surfaces with the gentlest method possible, such as low-pressure water and detergents, using natural bristle brushes.

Inspect painted masonry surfaces to determine whether painting is necessary.

Remove damaged or deteriorated paint only to the next sound layer using the gentlest method possible (e.g., hand scraping) prior to repainting.

Not Recommended

Failing to evaluate and treat the various causes of mortar joint deterioration, such as leaking roofs or gutters, differential settlement of the building, capillary action, or extreme weather exposure.

Cleaning masonry surfaces when they are not heavily soiled to create a new appearance, thus needlessly introducing chemicals or moisture into historic materials.

Cleaning masonry surfaces without testing or without sufficient time for the testing results to be of value.

Sandblasting brick or stone surfaces using dry or wet grit or other abrasives. These methods of cleaning permanently erode the surface of the material and accelerate deterioration.

Using a cleaning method that involves water or liquid chemical solutions when there is any possibility of freezing temperatures.

Cleaning with chemical products that will damage masonry, such as using acid on limestone or marble, or leaving chemicals on masonry surfaces.

Unit Masonry

Recommended

Apply compatible paint coating systems following proper surface preparation.

Repaint with colors that are historically appropriate to the building and district.

Evaluate the overall condition of the masonry to determine if only protection and maintenance are required, or if repairs to the masonry features are necessary.

Protect and maintain masonry by providing site drainage that does not negatively affect other site features.

Brace chimneys to improve their seismic resistance and ensure their survival during an earthquake.

Locate test cleaning patches in a representative, but inconspicuous, location. If there are different types of masonry or widely dissimilar substances to be removed, several test patches may be necessary.

Clean by proceeding in clearly defined areas delineated by structural or architectural features to minimize the visual impact of variations in the effects of cleaning.

Not Recommended

Applying high-pressure water cleaning methods that will damage historic masonry and the mortar joints.

Removing paint that is firmly adhering to, and thus protecting, masonry surfaces.

Using methods of removing paint that are destructive to masonry, such as sandblasting, application of caustic solutions, or high-pressure water blasting.

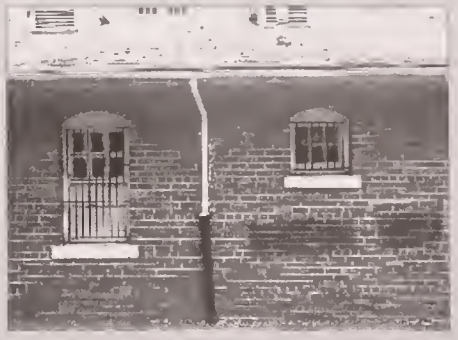
Failing to follow manufacturers' product and application instructions when repainting masonry.

Using new paint colors that are inappropriate to the historic building and district.

Failing to adequately protect masonry features.

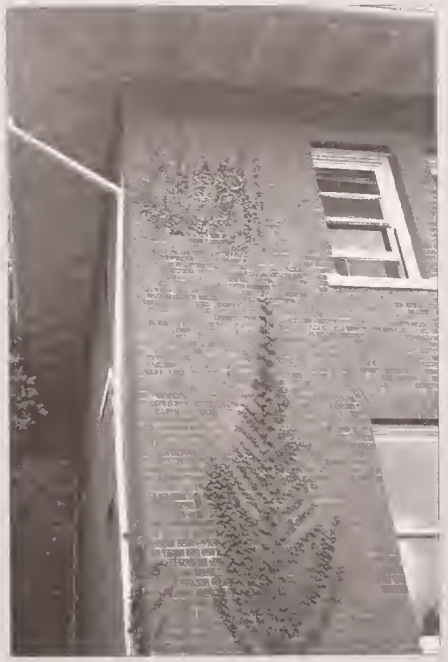
Using heat (applied with propane torch or similar device) to remove paint from masonry. Heat can crack and spall the masonry and cause softened paint to permeate porous masonry.

Some of the brick and much of the sandstone at the Presidio have been painted. Because it is almost impossible to remove paint from masonry without causing damage, the best approach is to remove only loose and peeling paint to a sound surface and repaint with a breathable masonry coating.



Graffiti can be removed from most masonry by a carefully selected chemical treatment without causing damage to the masonry. Be cautious of coatings designed to protect masonry from graffiti because they may discolor the masonry, inhibit moisture evaporation, and require reapplication after graffiti removal.

Unit Masonry



Climbing ivy, though picturesque, is harmful to masonry. Besides holding moisture against the wall, its tendrils can penetrate mortar, causing deterioration and allowing moisture to penetrate the wall and the building.

Recommended

Prune plants regularly and brush off growths such as moss or fungi by hand, using a stiff, nonmetallic brush and water. Consider chemical cleaners only if these gentle cleaning methods are inadequate.

Remove bird debris regularly to prevent heavy buildup by washing with cold water, supplemented with a mild detergent; use nonmetallic brushes or scrape with a wood scraper if necessary. Cleaning personnel should guard against exposure to potential health hazards by wearing protective masks, gloves, and clothing.

Identify specific material to be removed (such as the specific type of graffiti paint) to limit the application of solvents.

Apply an absorbent talc, whiting, or clay poultice with appropriate solvent to remove metallic stains, graffiti, and efflorescent salt deposits. Unlike particulate dirt, stains—especially industrial stains due to contact with fuel oil, asphalt, and tar—usually penetrate deeply into masonry. A poultice is generally the most effective removal method.

Not Recommended

Failing to repair leaky roofs, deteriorated flashing, rainwater pipes, or loosely fitting windows in a timely manner, causing moisture to enter the masonry walls and leading to deterioration.

Cleaning masonry without first sealing paths of water entry to prevent damage to the interior.

Cleaning masonry without first shielding adjacent materials that can be etched or damaged by chemical cleaners.

Applying herbicides as a means of controlling biological growth. They can introduce salts and acids into the masonry as well as create environmental problems. If properly managed, biological growth should not be an ongoing problem for buildings at the Presidio.

Planting flowers and shrubs that require frequent watering adjacent to masonry walls.

Recommended

Repair

Repair masonry walls and other masonry features by repointing the mortar joints where there is evidence of deterioration, such as disintegrating mortar, cracks in mortar joints, loose bricks, damp walls, or damaged plasterwork.

Remove deteriorated mortar by carefully hand-raking the joints to avoid damaging the masonry.

Duplicate old mortar in strength, composition, color, and texture; duplicate old mortar joints in width and in joint profile.

Use mud plaster as a surface coating over unfired, unstabilized adobe because it will bond to the adobe.

Repair masonry features by patching, piecing-in, or consolidating the masonry using recognized preservation methods. Repair may also include the limited replacement in kind—or with compatible substitute material—of those extensively deteriorated or missing parts of masonry features when there are surviving prototypes, such as terra-cotta brackets or stone balusters.

Not Recommended

Removing nondeteriorated mortar from sound joints, then repointing the entire building to achieve a uniform appearance.

Using electric saws and hammers rather than hand tools to remove deteriorated mortar from joints prior to repointing.

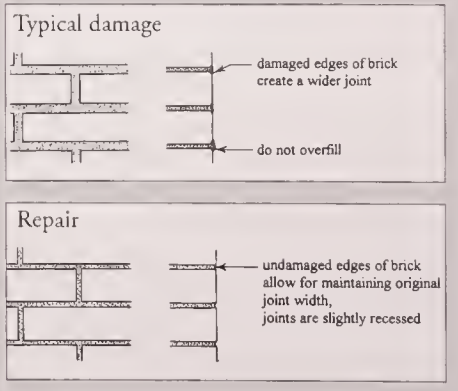
Repointing with mortar of high portland cement content (unless it is the content of the historic mortar). This often creates a bond that is stronger than the historic material, which can cause damage due to the differing coefficient of expansion and the differing porosity of the material and the mortar.

Repointing with a synthetic caulking compound.

Using a "scrub" coating technique to repoint instead of traditional repointing methods.

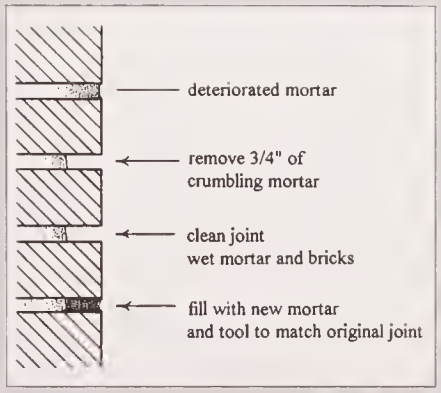
Changing the width or joint profile when repointing.

The building detail above shows an example of inappropriate repointing, using a portland cement mortar that is too strong and dense for the stone and that does not match the original in color, joint width, or tooling.

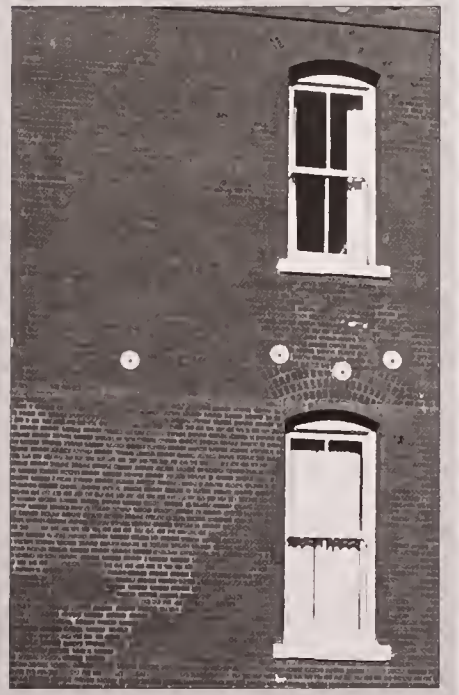


When repointing is necessary, the mortar color, composition, and tooling should be replicated. Maintaining the original joint width is an important aspect of repointing; avoid overfilling of joints.

Unit Masonry



Repointing must be carefully executed to maintain the appearance of the original masonry. The correct method for repointing is illustrated above. Below, a recently repointed area is readily apparent. The mortar is more visually dominant than originally intended.



Recommended

Apply new or nonhistoric surface treatments, such as water-repellent coatings, only after repointing and only if masonry repairs have failed to stop water penetration.

Use mortar of an appropriate strength to relieve stresses due to thermal expansion, settlement, or seismic activity. The mortar must be less strong than the stone or brick so that stresses can be relieved by cracks in the mortar rather than through the masonry unit. Mortar with a high percentage of portland cement is stronger than most stone or historic brick and is inappropriate.

Use mortar of an appropriate density, to allow water within the wall to migrate and escape. Portland cement is denser than most stone or brick and will force water to migrate through the masonry units.

Fill cracks in masonry units to reestablish structural integrity and prevent water penetration. Use a structural grout formulated to match the original masonry in strength and vapor transmission rate; use a mortar-like composite material that matches the original masonry in color, texture, and vapor transmission rate for surface treatment, including superficial cracks. Patch material should be weaker than the original. This type of repair should only be carried out under the supervision of a qualified architectural conservator.

Not Recommended

Applying cement stucco to unfired, unstabilized adobe. Because the cement stucco will not bond properly, moisture can become entrapped between materials, resulting in accelerated deterioration of the adobe.

Replacing an entire masonry feature such as a cornice or balustrade when repair of the masonry and limited replacement of deteriorated or missing parts are appropriate.

Using a substitute material for the replacement part of the masonry feature that does not convey the visual appearance of the surviving parts or that is physically or chemically incompatible.

Applying waterproof, water-repellent, or nonhistoric coating such as stucco to masonry as a substitute for repointing and masonry repairs. Coatings are frequently unnecessary, are expensive, and may change the appearance of historic masonry as well as accelerate its deterioration.

Using a chemical bonding agent to increase the bond of new mortar to old mortar rather than hand-raking the joints to a sufficient depth to guarantee mechanical keying. These agents are generally unnecessary and can be harmful to the masonry.

Recommended

Patch deteriorated or missing portions of a stone masonry unit by cutting back to sound material and either piecing in a matching stone replacement (a dutchman), or patching with a composite material formulated to match the original material in color, texture, strength, and vapor transmission rate.

Chemically consolidate deteriorating masonry only if such treatment is deemed appropriate by a professional conservator. Always test materials and procedures in an inconspicuous location before attempting full-scale treatment. Different types of stone will require different consolidation materials. Consolidation should not alter the appearance or vapor transmission rate of the original masonry.

Mock-up test areas for repointing or patching to serve as a quality-control standard. Locate the test area in a representative, but inconspicuous, place. The test patch should be approximately one square yard.

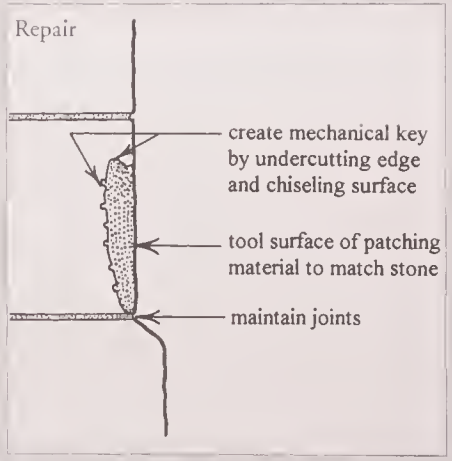
Not Recommended

Overfilling mortar joints when repointing. The visual effect of a full mortar joint as opposed to a slightly recessed joint is considerable and changes the visual character of the original masonry.

Patching masonry with portland cement. Aside from being visually incompatible, the material is too strong and dense for most masonry and will lead to deterioration.

Patching historic brick with modern brick, which is different in dimensions and edge detail.

Surface mounting elements such as metal conduits or downspouts onto a masonry unit. This not only destroys historic fabric, but also provides direct access for moisture to penetrate the masonry wall. In the rare case where attachment is appropriate, points of attachment should be made at mortar joints, not into the masonry unit.



The proper method of preparing and applying a masonry patch is illustrated above. The building detail at left is an inappropriate patch for a number of reasons; it uses portland cement, an inappropriate material that is too hard and dense for the original sandstone, and it does not match the original stone in color or tooling technique.

Unit Masonry

Molded brick with deteriorated mortar joints is shown above. The impressions from the mold used in manufacturing is evident at the edges of these bricks. Any replacement bricks should match such details. Modern, machine-made brick is extruded and wire-cut, resulting in a sharper edge.

The portland cement patch fills an earlier penetration. A more appropriate method would have been to fill the void with bricks and mortar that matched the original materials in color, size, composition, and tooling.

Recommended

Replace

Replace in kind an entire masonry feature that is too deteriorated to repair, if the overall form and detailing are still evident. Use the physical evidence as a model to reproduce the feature; examples are large sections of a wall, cornice, balustrade, column, or stairway. If use of the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.

Consider sustainability factors—such as resource depletion, toxicity of materials, maintenance levels, and resource recovery—in deciding whether to use a substitute material.

Replace brick, stone, and terra-cotta units with material matching the original in size, color, texture, density, and profile. Potential sources for replacement material should be considered early in a project to allow for delivery time. Salvaged materials merit consideration as replacement materials.

Not Recommended

Removing a masonry feature that is beyond repair and not replacing it; or replacing it with a new feature that does not have the same appearance.

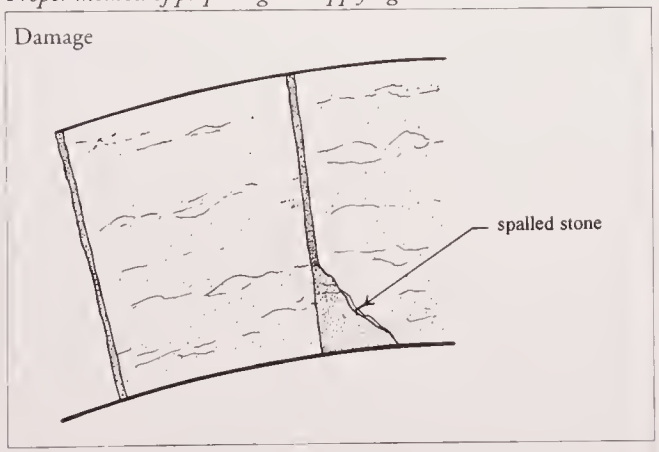
In the past, penetrations in masonry walls were often made with little concern for historic fabric. When penetrations are necessary, they should be made by neatly core-drilling as small a hole as possible through the fewest number of masonry units and finally covering the penetration with an escutcheon.

Recommended

Design for Missing Historic Features

Design and install a new masonry feature, such as steps or a door pediment, when the historic feature is completely missing. It may be an accurate restoration using historical, pictorial, and physical documentation; or a new design that is compatible with the size, scale, material, and color of the historic building.

Proper method of preparing and applying a stone dutchman.



Not Recommended

Creating a false historical appearance because the replaced masonry feature is based on insufficient historical, pictorial, and physical documentation.

Introducing a new masonry feature that is incompatible in size, scale, material, or color.

Excess moisture in the wall has caused water-soluble salts to migrate to the surface of the brick. This white deposit, called efflorescence, can usually be removed by simply brushing or rinsing with a minimal amount of water. The pattern of efflorescence suggests that clogged or insufficient drainage at the second-story deck is causing rainwater to move through the masonry piers. The drainage system should be redesigned to direct excess water off the deck and away from the piers.

If metal elements are attached to a masonry wall, they should be embedded into a mortar joint rather than into the masonry unit. When painting elements adjacent to masonry, carefully protect the masonry from paint spills.

Asphalt or bituminous waterproof coatings applied in the past are visually incompatible and can intensify damage to the masonry when moisture enters through cracks in the coating and cannot escape.

Concrete

UNREINFORCED CONCRETE

REINFORCED CONCRETE

CAST CONCRETE

CONCRETE BLOCK

Concrete

UNREINFORCED CONCRETE

REINFORCED CONCRETE

CAST CONCRETE

CONCRETE BLOCK

The term "concrete" applies to a composite material that consists of a mix of aggregate and a cementitious binder. Upon the introduction of water, the mix becomes plastic, undergoes a chemical reaction, and hardens permanently, assuming the shape of the form into which it was poured. The earliest surviving examples of concrete—built with a naturally occurring, high-quality, hydraulic cement—date from the Roman period. The surviving Roman work attests to the strength and durability of the material. Concrete was not widely used again in buildings until the mid-19th century, when reinforced concrete was invented and reliable manufactured hydraulic cements (such as portland cement) became available. Before 1906, however, existing building codes and powerful trade unions had blocked most concrete construction in cities. Concrete began to be used in an urban context when it was proved to be a superior structural and fireproofing material by withstanding the 1906 San Francisco earthquake and fire.

The San Francisco Bay Area was a center for the early development of reinforced concrete, due in part to the work of the Engineering Corps of the U.S. Army. Additionally, the military preserve of the Presidio was free of the code and trade union constraints that inhibited concrete construction elsewhere. As a result, the Presidio contains some significant examples of early concrete construction.

The quality, strength, and durability of concrete varied widely between the mid-19th century and the late 1920s, when scientific standards were adopted for the manufacture of the materials and for concrete construction methods. The preservation and restoration of historic concrete must proceed from an awareness of the complexity of the material and of how concrete technology developed.

Concrete varies in strength depending on its components, but is normally very strong in compression and weak in tension unless metal reinforcing is added. Both unreinforced and reinforced concrete can be either cast-in-place or precast. Cast-in-place concrete is poured on site into a previously erected formwork, which is removed after the concrete has set. Precast concrete is molded off site into building components such as trim, sometimes incorporating stone fragments or mineral pigments to imitate the color and texture of stone. Precast concrete block is a hollow or solid concrete masonry unit made from portland cement and laid up in mortar or grout as in unit masonry construction. Early concrete block was often finished with a thick layer of cement paste worked to resemble stone.

Concrete

Concrete deterioration can be caused by environmental factors, inferior materials, poor workmanship, inherent design defects, and inadequate maintenance. Prior to the 1930s, concrete materials varied greatly in quality and often included salts (chlorides), which have proved over time to accelerate deterioration. Workmanship deficiencies often included uneven mixing and inadequate vibrating, which could leave voids at the surface or at critical structural locations. The more common design flaws were insufficient protective concrete cover over reinforcing bars and lack of expansion joints to relieve stresses caused by thermal movement.

Environmental factors are a principal source of concrete deterioration. As a porous material, concrete readily absorbs moisture. When absorbed water freezes, it produces expansive pressure that causes spalling. Moisture penetration moves soluble salts and atmospheric pollutants into the body of the concrete and will initiate corrosion of the metal reinforcing bars. The high alkalinity of fresh concrete provides some protection against corrosion of metal reinforcing bars, but carbon dioxide and acid in the atmosphere and rain slowly neutralize the alkalinity (a process called carbonization) and diminish the protection of the embedded metals. Once initiated, corrosion will continue unless completely deprived of moisture and oxygen. Corrosion products formed on embedded steel produce tremendous expansive forces, which cause severe cracks and spalls in the concrete, and can lead to a complete loss of bond between the reinforcing bars and concrete, and to separation of the concrete into planes (a process called delamination). The most persistent environmental factor leading to deterioration at the Presidio is the heavily saturated marine air that carries salt and pollutants, because freezing temperatures are not common at the Presidio, and freeze-thaw cycles are not a significant factor in deterioration. Some chemical erosion has occurred in a few buildings where the concrete was subjected to acidic fumes or other chemicals from past occupancy.

Of the many concrete structures at the Presidio, all but a few are cast-in-place reinforced concrete. Some exterior concrete walls bear the impression of wooden form boards used during construction, but most have been coated with a cement stucco. This coating inhibits moisture penetration and corrects surface defects common in early, unvibrated concrete. The finish also conformed to the prevailing architectural style of the time at the Presidio, Mission Revival and Mediterranean Rivival, which employs light-colored planar walls. Nearly all concrete walls at the Presidio have been painted.

Before 1906, only a handful of nationally known architectural firms designed concrete buildings. One of these was the San Francisco firm of Percy and Hamilton, which designed the Battery Dynamite Power House, built in 1895. This project may have been designed with Ernest L. Ransome, an important pioneer of reinforced concrete, who frequently collaborated with Percy and Hamilton on its reinforced concrete buildings.

Concrete

Concrete should be cleaned only when it is necessary to halt deterioration. From the viewpoint of sustainable design, most methods of cleaning concrete have adverse effects on the environment. Water cleaning methods consume large amounts of water and can damage concrete by driving moisture into the wall and causing the reinforcing to corrode. Most chemical cleaning agents are toxic and can endanger the equipment operator as well as the environment. If solvents are used, special attention should be paid to their collection and reuse. Sandblasting to remove corrosion from reinforcing bars can damage adjacent materials and creates dust, which is a potential threat to the operator and nearby plant and animal life.

Concrete is a durable material requiring low maintenance. It is produced locally, and although initial manufacturing and the construction processes are moderately energy-consumptive and cause damage to the production site, byproducts are low in toxicity. Cured concrete can also be recycled as rubble or infill. Its structural properties and availability make concrete an excellent choice for many construction projects; however, each project should be carefully evaluated to confirm that concrete is the appropriate choice.

Most concrete walls at the Presidio were coated with a cement stucco to inhibit moisture penetration, correct surface defects, and conform to a style, as in the Mission Revival buildings above.

Concrete

Recommended

Identify, Retain, and Preserve

Identify, retain, and preserve concrete features that are important in defining the overall historic character of the building.

Identify finished surface texture, color, and coatings. Some walls bear the impression of wooden form boards used during construction, but most walls at the Presidio have been covered with cement stucco and painted. A few buildings are of tinted, exposed concrete, colored with mineral pigments added to the original concrete mix.

Identify the age and potential inherent preservation problems in original materials or construction methods, which may require laboratory analysis. Any rehabilitation plan must be based on a thorough knowledge of the properties of the original materials.

Identify type and location of reinforcing bars.

Not Recommended

Removing or radically changing concrete features that are important in defining the overall historic character of the building.

Specifying treatment of a particular building without a thorough understanding of the composition of the concrete.

A common design flaw in early concrete construction was insufficient protective concrete cover over reinforcing bars. Moisture can easily penetrate the light concrete cover and corrode the metal reinforcing bars.

Concrete

Ferrous staining is shown above, and biological growth is shown below. The surface should be cleaned only when necessary to halt deterioration, always using the gentlest method possible.

Recommended

Protect and Maintain

Protect and maintain concrete by ensuring that water is not absorbed. This may require proper drainage, repairing and filling cracks and spalls, or installing flashing at flat surfaces.

Clean concrete only when necessary to halt deterioration. Heavy soiling, bird debris, ferrous stains, graffiti, and biological growth can trap moisture and damaging chemicals against the surface of the concrete, initiating and sustaining deterioration.

Cover areas where pigeons roost with specially manufactured and sensitively installed bird netting.

Conduct concrete cleaning tests if cleaning is appropriate. Tests should be observed over a sufficient period of time to assess both the immediate and the long-range effects of cleaning. Clean concrete surfaces with the gentlest method possible, such as a low-pressure water rinse using a mild detergent applied with natural bristle brushes. Chemicals applied as a poultice may be necessary to remove tenacious stains without abrading surface texture or detail. After treatment, thoroughly rinse the surface of all residual chemicals.

Not Recommended

Failing to evaluate and treat the various causes of deterioration, such as leaking roofs or gutters, differential settlement of the building, capillary action (such as rising damp), or chloride contamination.

Cleaning concrete surfaces when they are not heavily soiled to create a new appearance, thus needlessly introducing chemicals or moisture into historic materials.

Cleaning concrete surfaces without testing or without sufficient time for the testing results to be of value.

Using a cleaning method that involves water or liquid chemical solutions when there is any possibility of freezing temperatures.

Cleaning with chemical products that will damage concrete or failing to rinse the surface clean of chemicals.

Applying high-pressure water cleaning methods that will damage historic surface treatment or coating and can drive water into the wall, causing corrosion of the steel reinforcing bar.

Concrete

Recommended

Inspect painted and stuccoed concrete surfaces to determine whether recoating is necessary. Failed coatings are characterized by flaking or loss of adhesion.

Remove damaged or deteriorated coating only to the next sound layer using the gentlest method possible (e.g., hand scraping) prior to recoating.

Apply compatible coating systems following proper surface preparation. Testing is mandatory to ensure that replacement material is compatible with the aesthetic and physical properties of the existing fabric and to determine short- and long-term adverse effects.

Recoat with materials, textures, and colors that are historically appropriate to the building and district.

Evaluate the overall condition of the concrete to determine if protection and maintenance are sufficent, or if material analysis and repairs are necessary.

Locate areas of delamination and incipient spalls by sounding. Spalled or delaminated concrete will reverberate with a distinctly hollow sound.

Not Recommended

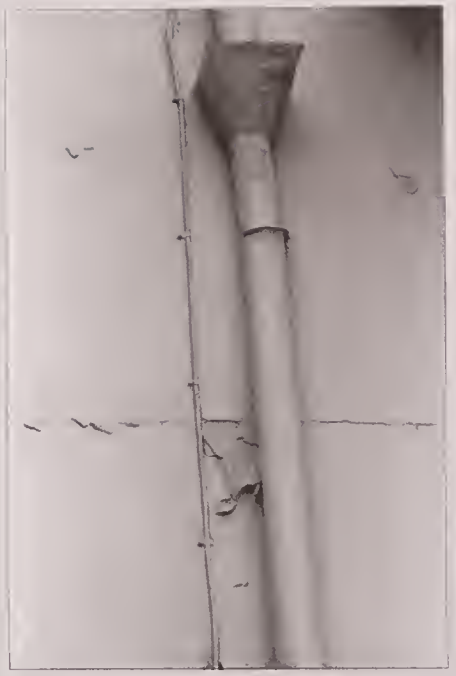
Sandblasting concrete surfaces using dry or wet abrasives, which permanently erode the surface of the material and accelerate deterioration.

Removing paint or stucco from historically coated concrete.

Removing sound stucco, then recoating the entire building to achieve a uniform appearance.

Removing paint or stucco by methods that destroy concrete, such as sandblasting, application of caustic solutions, or high-pressure water blasting.

Applying paint or other coatings such as stucco to concrete in a manner that creates a new appearance.



The nonfunctioning drainpipe above has caused water infiltration behind the paint layer and failure of the coating. Paint should be removed to the next sound layer and new coating applied after the drain is repaired.

Cracks, buckling concrete, and spalls indicate underlying deterioration, such as uneven settlement, illustrated at lower right, and corrosion of embedded reinforcing bars, illustrated above and at upper right. Corrosion can produce tremendous expansive forces, causing the surrounding concrete to rupture. Once initiated, corrosion of reinforcing bars will continue unless the steel is cleaned back to bright metal and immediately coated.

Recommended

Determine the cause and mechanisms of deterioration, such as settlement, cracks, corrosion, or chlorine contamination. Field tests (crack monitors) and laboratory analyses (petrographic analysis, chloride analysis, compressive strength tests) may be necessary to determine whether the deterioration is active or stable.

Stabilize the cause of deterioration before proceeding with repair.

Recommended

Repair

Coordinate all repairs and conservation treatment with any structural intervention.

Repair cracked, spalled, or damaged concrete to prevent water penetration.

Fill all cracks that will allow water to penetrate with a material matching the original concrete mix. It may be appropriate to fill structural cracks with a structural grout. Structural repair should be undertaken only by qualified professionals.

Provide drip grooves at the underside of overhanging eaves, edges of sills, belt courses, cornices, and projecting slabs if necessary.

Remove deteriorated concrete and incipient spalls to the next sound surface. The area of an incipient spall is visually apparent (by bulging outlined by cracks) or can be detected by sounding.

Not Recommended

Removing and not replacing a concrete feature that is beyond repair, or replacing it with a new feature that does not have the same appearance.

Patching concrete without removing the source of deterioration.

Applying rigid patching material in thermally induced (i.e., active) cracks.

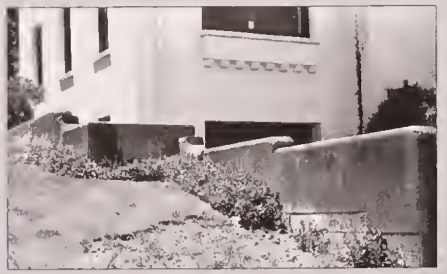
Applying patch or paint over corroded reinforcing bars or anchors without first cleaning all corrosion off the metal.

Spray-applying concrete or using plywood formwork for new patches when original concrete showed form marks of rough-sawn boards.

The building detail above shows evidence of damage due to moisture migration under eaves. Drip grooves may need to be added at the underside of overhanging eaves, edges of sills, belt courses, or projecting slabs if the original detailing was deficient and contributes to moisture retention and subsequent deterioration.

Concrete

Early concrete was sometimes finished with a thick layer of cement paste worked to resemble stone.



Surviving concrete site work such as retaining walls and steps should be maintained, stabilized, and repaired.

Recommended

Patch spalls and fill stable cracks with material duplicating the original concrete mix in strength, composition, color, and surface texture. To ensure a strong bond between new and original material, the patch must dovetail into the existing sound concrete.

Replicate original form and texture, such as marks of the formwork lumber. This requires imprinting lumber marks on fresh concrete patches using boards of appropriate dimension and surface texture.

Replace

Reproduce in kind an entire concrete element that is too deteriorated to repair, using physical evidence as a model. If a similar, nondeteriorated piece can be found on the building, a mold can be made for casting the replacement piece. Examples include precast artificial stone elements, projecting moldings, balustrades, columns, or stairways.

Not Recommended

Patching concrete without first correcting the source of deterioration will result in failure of the repair, as in the building detail above. Previous patches that do not match the texture or color of the original wall surface should be removed and replaced with material duplicating the original mix in composition, strength, color, and surface texture.

Replacing or rebuilding a major portion of repairable concrete features, which is essentially new construction, such that the building is no longer historic.

Replacing an entire concrete feature such as a cornice or balustrade when repair and limited replacement of deteriorated or missing parts are appropriate.

Recommended

Design for Missing Historic Features

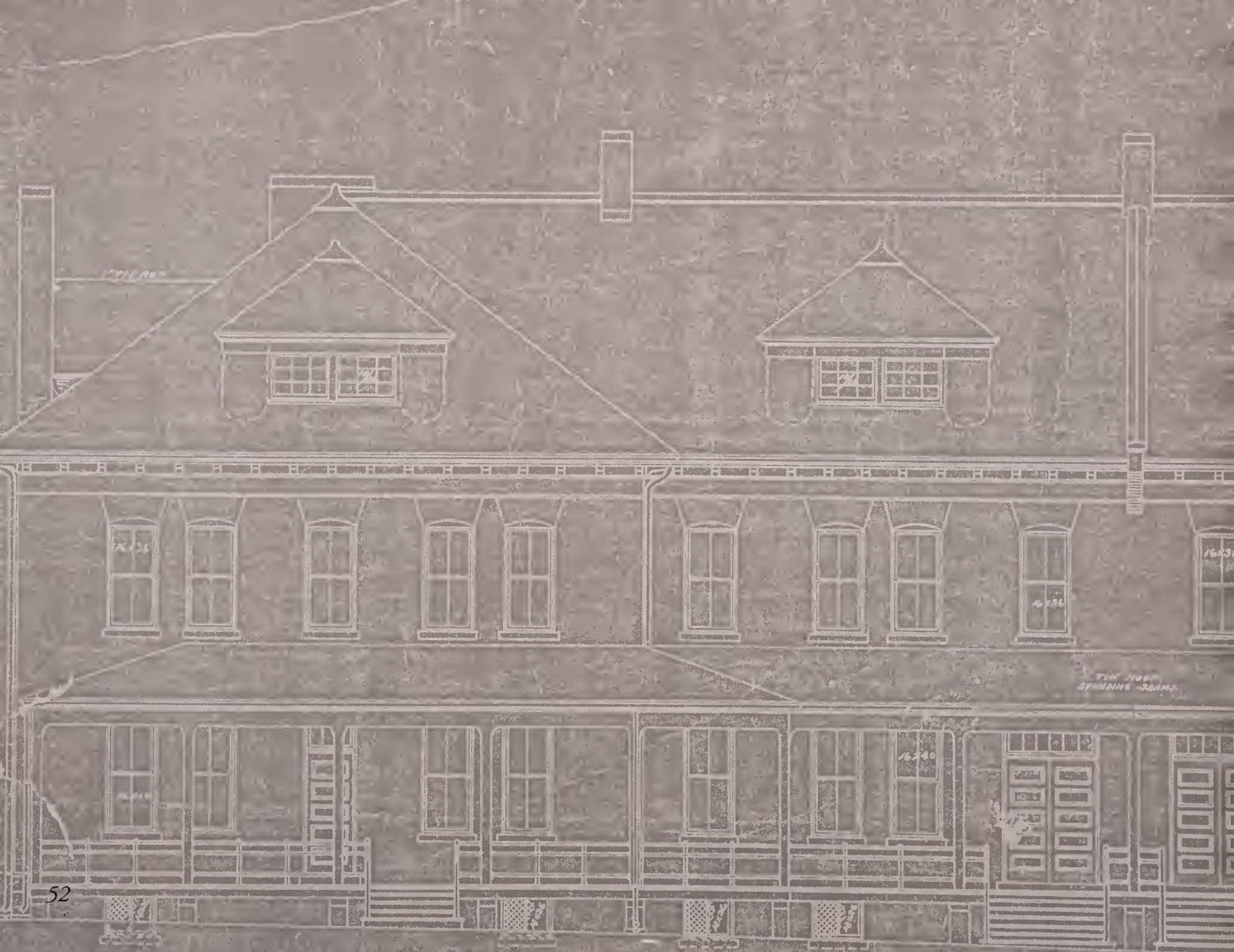
Design and install a new concrete feature when the historic feature is completely missing. It may be an accurate restoration using historical, pictorial, and physical documentation; or an entirely new design, compatible with the size, scale, material, and color of the historic building.

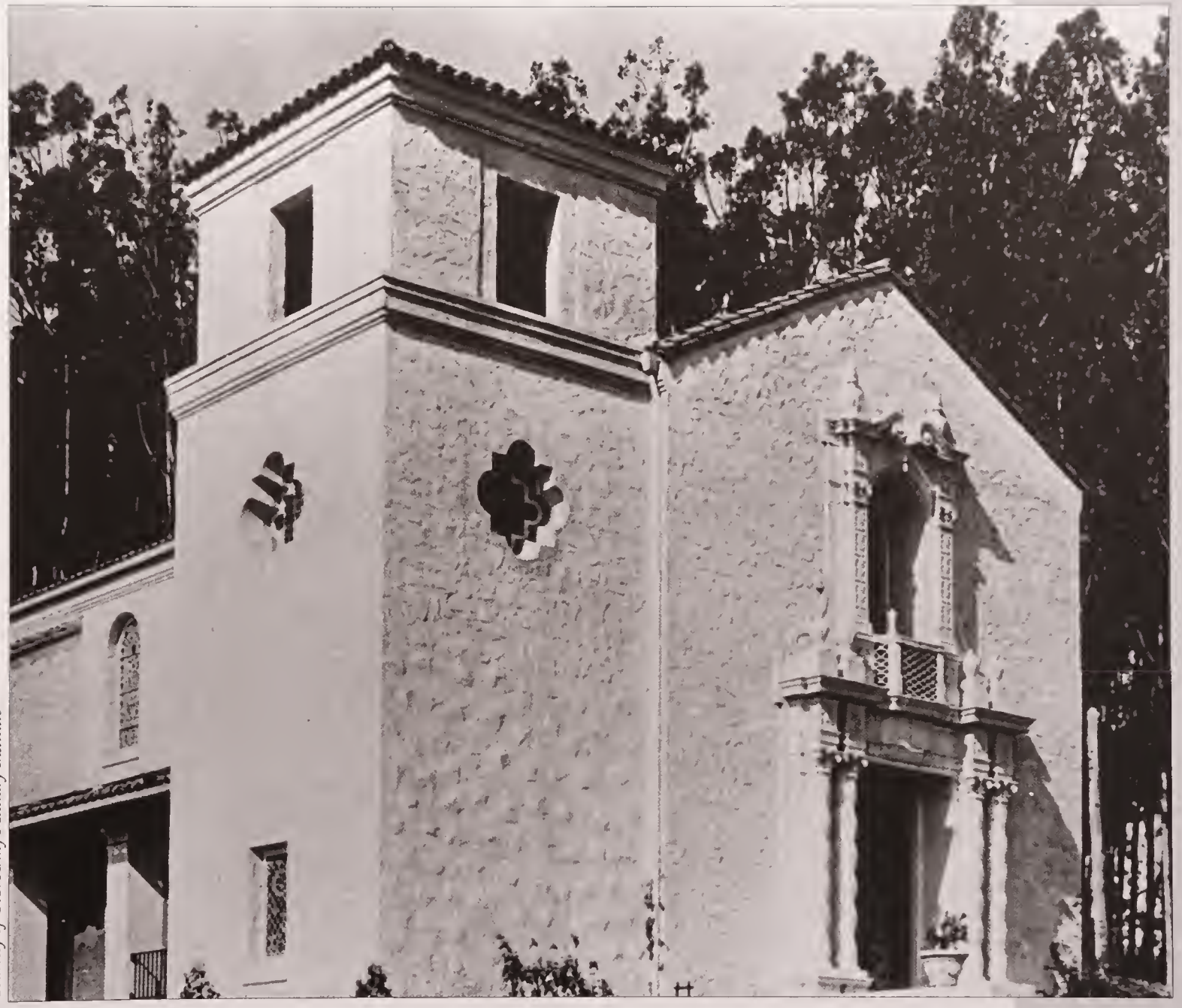
Not Recommended

Creating a false historical appearance because the replacement concrete feature is based on insufficient historical, pictorial, and physical documentation.

Introducing a new concrete feature that is incompatible in size, scale, texture, or color.

Cast concrete, such as the door surround above, sometimes replicated stone by incorporating stone fragments or mineral pigments into the original mix. Any repair should reproduce the original mix even if at present the feature is covered with paint or stucco.





Courtesy of U.S. Army Military Institute

Stucco

Stucco is an exterior plaster used to weatherproof and decorate building exteriors. Although stucco is nonstructural, it offers a protective coating and some fire resistance, and prolongs the life of the building. Stucco is both convenient and affordable: its ingredients are readily available; it can be applied over a variety of building materials, including dried earth, stone, brick, concrete, and wood or metal lath; and it is possible to repair cracks or breaks in a stucco coating.

An aggregate and a binder are the two basic stucco constituents. The aggregate consists of a fine granular substance—such as crushed seashells, crushed brick and stone, sand, or old mortar—while traditional binders include lime, clay, gypsum, or natural and manmade (portland) cements. In addition, mineral pigments can be added for color, and synthetic additives can be used to further improve the performance of the stucco mixture.

A mechanical key must be created to ensure a strong bond between stucco and its support. For masonry, either raking out the mortar joints or texturing the masonry surface is usually necessary. Wood, metal, or wire lath provide a network of voids into which the wet stucco can penetrate and harden to form an interlocking mechanical key. Generally, stucco is applied in one to three coats; three-coat work is most common. Layers usually differ slightly in composition, and each coat is scored to provide a key for the next layer.

Although the earliest stuccoes used lime as a binder, by the middle of the 19th century stucco included other elements such as imported natural cement. Gray portland cement stucco, harder and denser than earlier stuccoes, appeared in the 1880s; with the introduction of white portland cement in the early 20th century, a range of tinted stuccoes became available. These last coincided with and were widely employed in the Mission Revival and Mediterranean Revival architectural styles (ca. 1890–1930).

Stucco

Nearly all stucco throughout the Presidio is painted a light color. Historical photographs indicate that many stucco buildings may have originally been unpainted or painted a darker color than the current coating. Some buildings appear originally to have featured an ochre-tinted stucco, troweled to mimic mud plaster over adobe, which recalled in color and texture the earliest Presidio buildings.

Most stucco at the Presidio has a high portland cement content and is applied with a smooth troweled finish directly over reinforced concrete or masonry. Notable exceptions include the Main Post Chapel, with stucco worked to imitate plastered rubble masonry and some houses which are stuccoed wood-frame construction. The majority of stuccoed buildings at the Presidio date from the period of Mission Revival and Mediterranean Revival styles of architecture.

The materials required to produce stucco are readily available and of a fairly simple character; however, the choice of materials for the aggregate and binder is critical to match an existing stuccoed surface. Stucco is an inexpensive material that forms a resistant exterior shell to protect more costly materials in the substrate from exposure and decay; it may considerably prolong the life of a building by sheltering major building components from wear. Stucco also offers some fire protection for wood construction; a stuccoed wall is less readily combustible than exposed timbers. Also, though stucco application requires a skilled worker, only a minimal amount of specialized equipment is necessary.

Stucco failure is caused by the breakdown of the its water-shedding capacity and the ultimate deterioration of the supporting structure. Poor original materials and techniques, incompatible building materials with different expansion rates, structural settlement, seismic movement, and biological growth can all cause cracking or adhesion failure between the stucco and its backing or between individual stucco layers. Lack of proper maintenance increases the likelihood of problems that can lead to the breakdown of the stucco skin.

Smithsonian Institute, Courtesy of Presidio Museum

A cement stucco coating has been applied to some masonry buildings at the Presidio to improve their water-shedding capacity or for stylistic reasons. The Mission Revival style Stillwell Hall was built of reinforced concrete and brick, but was always covered by a unifying light-colored cement stucco.

Stucco

Although most stucco at the Presidio has a smooth troweled finish, some stucco, as in the examples on this page, has been worked to imitate plaster over rubble masonry or dressed stone.

Recommended

Identify, Retain, and Preserve

Identify, retain, and preserve stucco coatings that are important in defining the overall historic character of the building.

Determine whether the historic finish coat of stucco was painted, unpainted, or integrally colored.

When repairing stucco, identify original components of the stucco mix through laboratory analysis to match strength, composition, color, and texture.

Identify substrate and method of keying stucco to the underlying structure to identify potential problems such as corroding metal lath.

Identify finish troweling techniques to duplicate the original finish in replacement stucco.

Not Recommended

Removing stucco from surfaces that historically featured a stucco finish.

Removing and reapplying a major portion of a stucco coating that could be repaired.

Applying paint to stucco that has been historically unpainted or, conversely, removing paint from historically painted stucco.

Recommended

Protect and Maintain

Maintain roofs, gutters, and downspouts to prevent moisture from penetrating walls.

Remove all plant materials from the base of stuccoed walls.

Clean stucco only when necessary to halt deterioration or remove heavy soiling. It is difficult to clean most stucco without also removing some of the textured surface.

Test cleaning methods in a discreet location before full-scale treatment. The gentlest method should be selected and tested to avoid unnecessary damage.

Survey stucco surfaces for conditions such as biological growth, water or metallic staining, or leaching deposits, which may indicate active water penetration or damage that is masked by the stucco coat.

Remove soiling and biological growth, such as mold, using a low-pressure water rinse and mild detergent applied with natural fiber brushes. Poultice-applied solvents are probably the most appropriate method for removing graffiti and metallic stains.

Not Recommended

Failing to evaluate and treat the various causes of stucco deterioration, such as leaking roofs or gutters, differential settlement of the building, or ground moisture penetrating into the structure.

Cleaning stucco surfaces without testing or without sufficient time for the testing result to be of value.

Using abrasive cleaning techniques on stuccoed surfaces, which can pit the surface and increase moisture penetration.

A stucco finish was often applied to cover surface defects.

Stucco can mask serious problems in the substrate until well after damage has occurred. In the example above, stucco covered ongoing fungal rot due to water infiltration in the wood structure.

Stucco

Textured stucco provides ledges where airborne dirt collects. Dirt can be gently brushed off or rinsed with low-pressure water cleaning. Chemical cleaning should be undertaken only if the dirt is causing deterioration. The gentlest cleaning method should be determined and tested. It is difficult to clean most stucco without losing some surface texture.

Biological growth is generally an indication of more serious problems that have led to moisture retention in the wall. The basic problem must be remedied before stucco is repaired and cleaned.

Recommended

Remove damaged or deteriorated paint from stucco only to the next sound layer using the gentlest method possible, such as hand-scraping or natural bristle brushes.

Maintain paint coatings by applying vapor-permeable coating when necessary, matched to existing color.

Repair

Determine the extent of detached stucco by systematically sounding the surface with a wood or acrylic mallet. Areas where stucco layers have delaminated or are no longer keyed to the substrate will produce a characteristic reverberating or hollow sound and should be repaired as outlined below.

Repair most stucco by removing damaged material and patching with new stucco that duplicates the old in strength, composition, color, and texture.

Repair cracks in stuccoed surfaces by raking out the crack and undercutting the edges to provide a mechanical key for new stucco. Cracks are most likely to occur at doors, windows, and floor lines, and where stucco covers joints between dissimilar building materials.

Not Recommended

Removing sound stucco or repairing with new stucco that is stronger or denser than the historic material (which will damage underlying masonry and softer, more porous stucco) or that does not have the same appearance.

Inserting metal lath over masonry. Attaching the lath will damage the masonry, and moisture penetration can cause the metal lath and attachments to corrode.

Applying a stucco patch without remedying the underlying problem.

Recommended

Remove incipient spalls or bulges back to sound plaster. Identify and rectify the cause of deterioration before patching.

Remove previous patches that do not match texture, color, or strength of the original stucco.

Undercut the repair boundaries to create a dovetail-shaped mechanical bond between the old and new stucco.

Test new stucco in an inconspicuous location and allow test samples to weather as long as possible, ideally for one year. Matching the original material will probably require a number of test samples.

Patch stucco rather than replace. It is difficult to match stucco and to conceal patched areas, especially on smooth-finished stucco. A color match may not be critical if the surface was originally painted and will be repainted following repairs.

Thoroughly wet substrate (except metal lath) before patching, to prevent it from drawing moisture out of the stucco too rapidly, which could affect the curing time and eventual strength.

Not Recommended

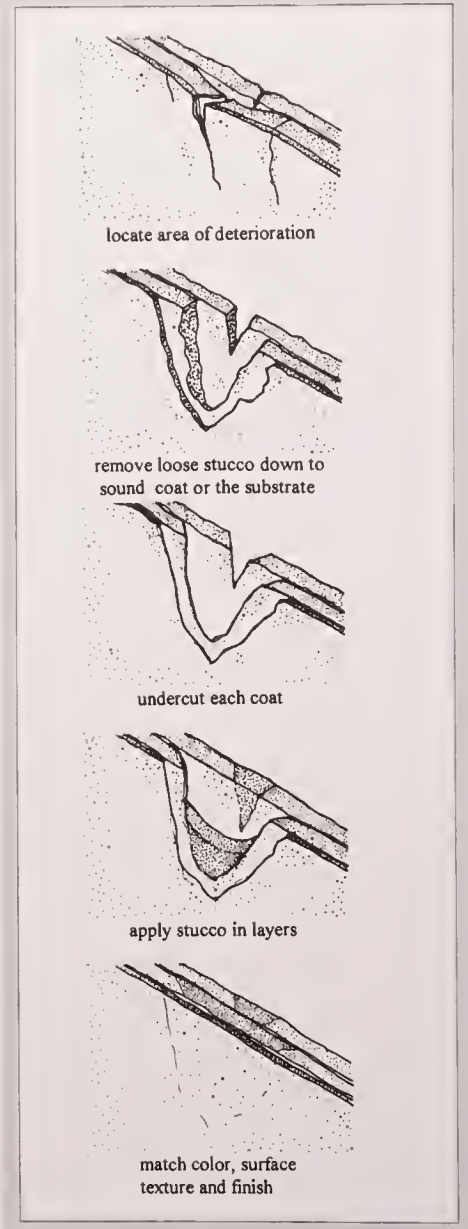
Patching cracks with commercial caulking compounds. This type of patch is highly visible because the material has a different texture and sheen than stucco. It also tends to attract dirt and weathers differently.

Applying new stucco when there is danger of frost, or in temperatures below 40°F.

Applying stucco without providing adequate separation from the ground. Moisture from the ground can rise through the stucco and into the supporting structure.

Applying paint to repair patches before the new stucco has fully cured.

Applying a bonding agent where a mechanical bond is possible. A good mechanical bond is always preferable to reliance on bonding agents. Only substrates that do not offer a good bonding surface may require the use of an agent.



The repair of stucco requires that each coat be patched separately.

Stucco

Previous patches that do not match the texture, color, or strength of the original stucco should be removed. Stucco patches were often applied without first remedying the underlying problem, which leads to failure of the new patches.

Recommended

Remove distorted or damaged lath and replace with metal lath, overlapping edges and securing with wire ties. Metal lath is the most appropriate replacement lath, because it is less vulnerable to moisture and insect damage than either wood or perforated gypsum board. The stucco finish on many Presidio buildings was applied directly over reinforced concrete, without lath. Stucco repair to these buildings may require a bonding agent to provide strong adhesion between the repair patch and the original substrate.

Prevent new stucco from drying too rapidly during hot weather by shading or repeated misting for 48 to 72 hours.

Reintegrate detached or delaminated stucco by low-pressure injection grouting with fluid mortars or synthetic adhesive materials. These substances must be compatible with the original stucco. This treatment is generally appropriate only for decorative stucco that may be difficult to replicate. The work should be executed under the supervision of a qualified architectural conservator.

Use chemical consolidants on deteriorated stucco only when deemed necessary by a trained conservator. The need for this type of treatment at the Presidio is limited. Materials and methods must be tested before attempting full-scale treatment; different stuccoes may require different consolidation materials for chemical compatibility.

Design modifications where faulty original design or construction details (such as inadequate control joints) have led to chronic deterioration. Modifications should be built into the new work without visually altering the original appearance.

Not Recommended

Metallic stains from copper or iron penetrate deeply into stucco and are difficult to remove. The safest and most effective removal technique is the application of appropriate solvents using poultices.

Recommended

Replace

Replace in kind an entire stucco finish that is too deteriorated to repair using physical evidence to replicate the original mix and finish texture.

Design for Missing Historic Features

Design and install a new stucco feature or finish when the historic feature is completely missing. It may be an accurate restoration using historical, pictorial, and physical documentation; or a new design that is compatible with the size, scale, material, and color of the historic building.

Not Recommended

Replacing a major portion of a stucco finish that could be repaired, so that the stucco finish is no longer historic and is essentially new construction.

Creating a false historical appearance because the replaced stucco is based on insufficient historical, pictorial, and physical documentation.

Introducing a new stucco feature or finish that is incompatible in size, scale, texture, or color.

Surface runoff should be directed away from the base of a stuccoed building. Unless contact with the ground and plant material is prevented, moisture will rise through the stucco and into the substrate.


TIN ROOF
STANDING SEAMS

Courtesy U.S. Army Military History Institute

Wood

Because it can be easily shaped by sawing, planing, carving, and gouging, wood is used for architectural features such as clapboard, cornices, brackets, entablatures, shutters, columns, and balustrades. These wooden features, both functional and decorative, may be important in defining the historic character of the building. Their retention, protection, and repair are important in rehabilitation projects.

Wood has played a central role in American building during every period and in every style. Whether as structural members, exterior cladding, roofing, interior finishes, or decorative features, wood is frequently an essential component of historic and older buildings.

San Francisco and the windswept Presidio site originally sheltered few trees, but elsewhere along the coast large stands of redwood and Douglas fir fueled a flourishing lumber industry. Milled lumber was cheap and easily transported by barge to the Bay; as a result, wood is the main structural and finish material in nearly all the historically significant Presidio buildings. The first buildings built after the transfer of the Presidio to the U.S. Army in 1848 were wood throughout: structural frames and foundation piers, exterior wall cladding and roofing, interior and exterior trim. There were a variety of cladding types, including board-and-batten, horizontal siding in varying widths and thicknesses, and wood shingles. Except for one example of log timber construction, all wood buildings were constructed of milled lumber.

A number of wood barracks and warehouses, designed as temporary buildings, were quickly built for service during World Wars I and II. For the most part, the major buildings at the Presidio are constructed of masonry with substantial wood elements, including roof and floor structures, stairs, porches, floorboards, doors, window frames and sashes, and trim.

Exterior wood trim on historic buildings often performs the dual function of protection and decoration. Moldings, siding and trim not only create visual interest with highlights and shadows, but also have practical value. In addition to covering joints and protecting the wood endgrain, they direct rainwater from one component to the next and eventually to the ground.

Moisture, usually in combination with other influences such as insects and fungi, weakens the structure of wood and is the main cause of wood deterioration. Common design flaws in many of the wood buildings, especially the temporary buildings, are inadequate separation from the soil and insufficient drainage. These conditions allow moisture to migrate through wood foundations and spread to the main structure.

Wood

Paint is one of the most effective means of waterproofing a wood surface, and most exposed wood at the Presidio has been painted. Although few original coatings are still visible, decorative paint finishes—such as wood-graining or stenciling—were rarely used. Paint makes it difficult to identify wood species, but it appears that the wood is primarily local redwood and Douglas fir. Oak, maple, and pine are used for some interior flooring and finishes; some interior wood has been stained and varnished to enhance the wood grain and color. Interior wood at the warehouses and stables appears to have originally been left unfinished, though some has since been painted.

Fire is a constant threat to wood structures. After several serious fires, numerous fire-preventive measures were instituted at the Presidio, including replacement of the original wood shingle roofs with fire-resistive materials, and replacement of wood with masonry as the primary building material.

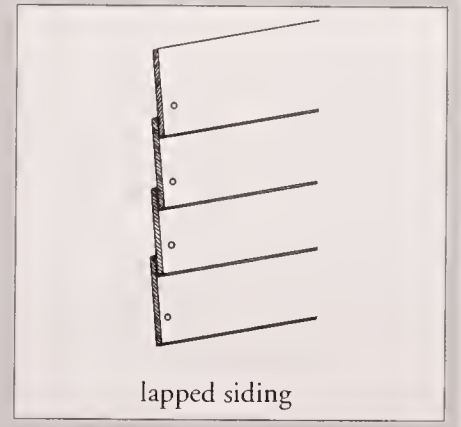
Treatments for insect and fungal attack include treating wood with insecticides and preservatives, treating the surrounding soil, and fumigating. However, each of these methods is also harmful to the environment and can damage certain types of metal, paint, and interior finishes. As a result, the National Park Service has introduced an Integrated Pest Management Program for alternative nontoxic pest treatments.

There are a number of more sustainable alternatives to harsh chemical treatments. Preventive measures, such as providing adequate ventilation and installing metal flashing to separate wood from possible sources of moisture, can contribute substantially to preventing decay. Clearing gutters and drains of debris and maintaining painted surfaces will significantly prolong the life of a wood structure. Although traditional stripping and refinishing products are toxic, carcinogenic, and high in volatile organic compounds, new water-based products are less poisonous and do not produce polluting hydrocarbons. Stripping and refinishing products and epoxies are highly flammable and must be used with care; they cannot be stored in wood buildings. The National Park Service will provide regulatory and technical information and guidance on which wood preservatives and other treatments are acceptable.

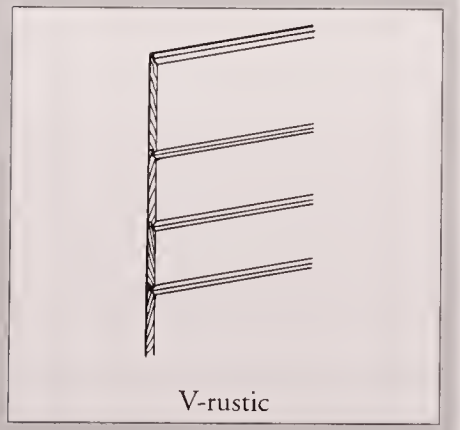
The Presidio has a number of historic wood buildings. Wood is also a substantial part of both the interiors and exteriors of many masonry buildings, such as the wood porches and cornice on the brick and stone building immediately above.

Wood

drop siding



lapped siding



V-rustic

Recommended

Identify, Retain, and Preserve

Identify, retain, and preserve wood features that are important in defining the overall historic character of the building, such as siding, cornices, brackets, window architraves, and doorway pediments, and their paints, finishes, and colors.

Identify the species of wood, grain pattern, dimensions, millwork, shaping, joining, and finishing techniques, and means of fastening.

Determine if a wood element functions as a structural, decorative, or finish material, and select the appropriate treatment.

Different wood cladding types in use at the Presidio are illustrated on these two pages. In the past, deteriorated cladding was not always replaced in kind; one building may have two or more types of siding on different elevations. Missing or damaged wood cladding should be replaced in kind in a timely manner to avoid water infiltration and deterioration of the underlying structure and interior finishes.

Not Recommended

Removing or radically changing wood features that are important in defining the overall historic character of the building, such that the character is diminished.

Removing a major portion of the historic wood from a facade (instead of repairing or replacing only the deteriorated wood), then reconstructing the facade with new material to achieve a uniform or "improved" appearance.

Radically changing the type of finish or its color or accent scheme so that the historic character of the exterior is diminished.

Stripping historically painted surfaces to bare wood, then applying clear finishes or stains to create a "natural look."

Stripping paint or varnish to bare wood rather than repairing or reapplying a special finish (e.g., a grain finish to an exterior wood feature such as a front door).

Removing all paint layers without retaining samples for analysis and documentation.

Recommended

Protect and Maintain

Protect and maintain wood features by providing proper drainage so that water is not allowed to stand on flat horizontal surfaces or accumulate in decorative features.

Apply environmentally safe chemical preservatives to wood features, such as beam ends or outriggers, that are exposed to decay hazards and are traditionally unpainted.

Retain coatings such as paint that help protect the wood from moisture and ultraviolet light. Paint removal should be considered only where there is paint surface deterioration and as part of an overall maintenance program that involves repainting or applying other appropriate protective coatings.

Inspect painted wood surfaces to determine whether repainting is necessary or if cleaning is all that is required.

Remove damaged or deteriorated paint to the next sound layer using the gentlest method possible (hand scraping and hand sanding), then repaint.

Not Recommended

Failing to identify, evaluate, and treat the causes of wood deterioration, including faulty flashing, leaking gutters, cracks and holes in siding, deteriorated caulking in joints and seams, plant material growing too close to wood surfaces, or insect or fungus infestation.

Using chemical preservatives, such as creosote, that can change the appearance of wood features.

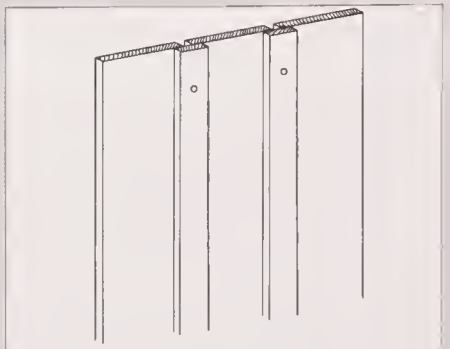
Stripping paint or other coatings to reveal bare wood, thus exposing historically coated surfaces to the effects of accelerated weathering.

Removing paint that is firmly adhering to, and thus protecting, wood surfaces.

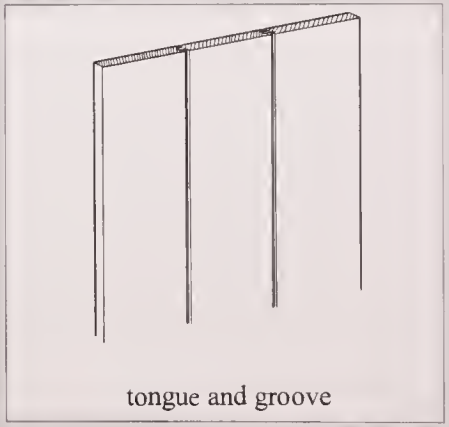
Using destructive paint removal methods, such as propane or butane torches, sandblasting, or water blasting. These methods can irreversibly damage historic woodwork.

Using thermal devices improperly, so that the historic woodwork is scorched.

Failing to thoroughly neutralize the wood after using chemicals; unless the wood is neutralized, new paint will not adhere.



board and batten siding



tongue and groove

shingles

Wood

Exposed rafter ends are character-defining features of many Presidio buildings. Wood in this position is especially vulnerable to fungal rot and attack by insects, because the endgrain of the wood—which is softer and readily absorbs water—is exposed.

A common design flaw in wood buildings at the Presidio is inadequate separation from the ground. Moisture seeps through the wood member and into the structure. This makes a building susceptible to attack by insects and fungi and to damage by rodents and other small animals.

Recommended

Carefully use electric hot-air guns on decorative wood features and electric heat plates on flat wood surfaces when paint is so deteriorated that it must be totally removed prior to repainting. Burning paint produces toxic fumes and is a fire hazard. It is prohibited at the Presidio.

Use chemical strippers primarily to supplement other methods, such as hand scraping, hand sanding, and the above-recommended thermal devices. With the proper safeguards, detachable wooden elements—such as shutters, doors, and columns—can be chemically dip-stripped.

Limit paint removal. Generally, wood at the Presidio should be stripped only if it is necessary to make elements operable (such as windows), or to remove lead-containing paint.

Apply compatible paint coating systems following proper surface preparation.

Repaint with colors that are appropriate to the historic building and district based on historic paint layer analysis.

Evaluate the overall condition of the wood features to determine if protection and maintenance are sufficient, or if repair is necessary.

Not Recommended

Allowing detachable wood features to soak too long in a caustic solution, which raises the wood grain and roughens the surface.

Failing to follow manufacturers' product and application instructions when repainting exterior woodwork.

Using new colors that are inappropriate to the historic building or district.

Failing to undertake adequate measures to ensure the protection of wood features.

Relying on brush- or spray-applied insecticides or preservatives, or those incorporated into paint coatings. These are generally ineffective, because penetration is superficial and the interior of the member is unprotected.

Treating wood with preservatives that alter its appearance. Preservatives generally release objectionable odors, can stain or corrode adjacent materials, and may affect future paint application.

Applying coatings, such as acrylics, to wood flooring. They produce a slippery surface, require regular replacement, and are difficult to remove.

Recommended

Correct conditions that allow moisture intrusion. This includes repairing damaged or missing gutters and downspouts, and providing adequate ventilation and separation from the ground and surrounding vegetation.

Inspect wood surfaces and structural elements regularly for signs of moisture retention and insect or fungal attack. Peeling paint, spongy wood, discoloration, staining, and the presence of fungi are clear indicators. Insect damage generally occurs on the interior of a wood member and may be hidden until the structural integrity is severely compromised. Sills and wood joints or members bearing on masonry are particularly susceptible to rot, because they are frequently subjected to moisture.

Maintain successful existing details of joints and flashing that keep water out of wood assemblies, and consider historic detail reconstruction before caulking.

Use shades or awnings to control direct sunlight on interior wood finishes to prevent ultraviolet damage.

Not Recommended

Sanding floors when not absolutely necessary. Sanding removes a considerable amount of historic fabric.

Applying sealants without addressing the cause of the problem or as a substitute for good detailing of joints and flashings.

An example of biological staining is shown above, and metallic stains from corroding steel nails are shown at upper left. Countersunk galvanized nails, with a wood filler applied over the heads of the nails, or stainless-steel nails should be used to avoid metallic stains. Gentle cleaning with a low-pressure water rinse and mild detergent applied with a soft bristle brush should remove biological growth.

Wood

Peeling paint in large areas usually indicates more serious problems. In this case, a deteriorated roof or missing gutters are likely causes of the deterioration.

Foundation skirts of spaced vertical boards allow air to circulate through the crawl space, ventilating the foundation. Good ventilation is the key to preventing rot in wood members exposed to moisture.

Recommended

Paint only areas that require repainting. Elevated areas exposed directly to sunlight and weather will require more frequent painting than the rest of the building. To reduce paint buildup on the exterior and interior, paint only those elements that require repainting. However, spot-painting is generally not recommended, because it creates an irregular appearance.

Maintain wood floors by cleaning and waxing regularly. Wear and decay can be slowed through regular maintenance. Limit wear of existing wood floors in heavily trafficked areas by covering with a reversible protective surface (e.g., carpet).

Protect wood floors and structural members in historic warehouses from damage by forklifts and other heavy equipment.

Not Recommended

Rough-sawn unpainted posts and finishes in the warehouses and stables are important character-defining elements of these interiors. Mechanical loading equipment has damaged historic floorboards and posts. The historic fabric must be adequately protected from future damage.

Recommended

Repair

Repair wood features by patching, piecing-in, consolidating, or otherwise reinforcing the wood using recognized preservation methods. Where there are surviving prototypes such as brackets, molding, or sections of siding, repair may also include the limited replacement in kind—or with compatible substitute material—of those extensively deteriorated or missing parts of features.

Strengthen weakened wood members by adding new members alongside the original. Wood structures are most commonly weakened when the original cross section of a structural member is reduced by cutting out portions during alterations, by fire, or by insect damage or fungal rot. Rot on the original member must be removed before installing new material.

Replace missing wood features, especially those on the exterior, in a timely manner. Exterior wood components are usually designed and joined to prevent water from penetrating joints. One missing element can compromise the entire system.

Not Recommended

Replacing an entire wood feature, such as a cornice or wall, when repair of the wood and limited replacement of deteriorated or missing parts are appropriate.

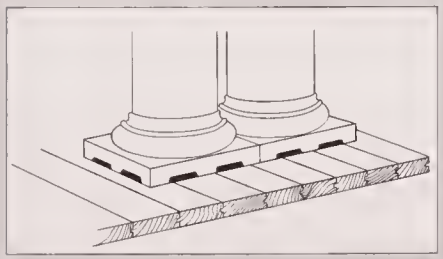
Using substitute material for the replacement part that does not have the appearance of the surviving parts of the wood feature or that is physically or chemically incompatible.

Using nongalvanized fasteners in moist conditions. These can discolor and chemically attack certain woods, including redwood, Douglas fir, and oak.

Nailing old brittle wood, causing it to split.

Paint is an effective means of keeping wood dry. The protective coating must be maintained, but unnecessary painting should be avoided. Sometimes the more exposed facade of a building, similar to that illustrated at left, can be painted more frequently than the entire structure. This will avoid unnecessary paint buildup on other facades, which can dull the wood's texture. Surface texture, like the rough-sawn lumber pictured above, is a significant part of the character of wood and should not be obscured.

Column bases are particularly vulnerable to rot, because the endgrain of the wood is exposed to moist conditions and rot in the wood decking can easily spread to the column. The drawing below illustrates a good detail characteristic of some Presidio buildings. A metal base is designed to allow ventilation between the decking and the column base, interrupting the path of moisture and isolating columns from the deck.



Recommended

Remove a damaged or decayed section only, rather than the entire wood member. Repair wood elements using wood that matches the original in dimension, finish, and species, unless the species is endangered, in which case an appropriate substitute should be used.

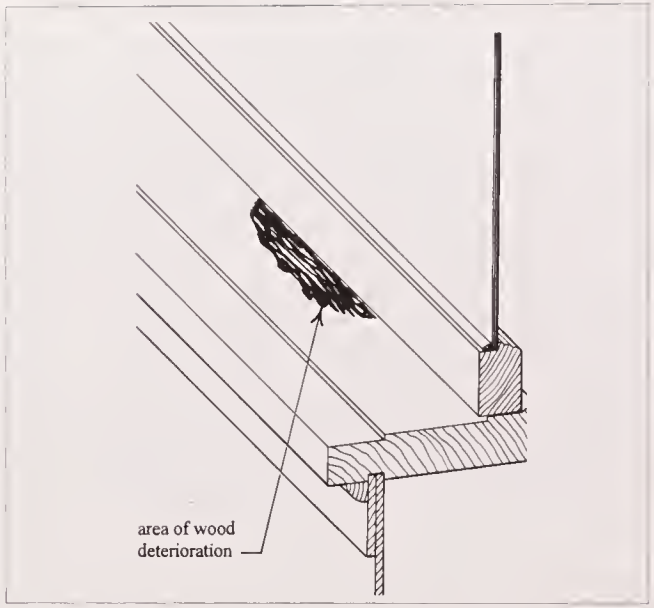
Repair voids left after removal of damaged wood by inlaying pieces of wood cut to precisely fit the void. In this type of repair, called a dutchman, the wood should match the original in species and color, and care should be taken to continue the grain pattern.

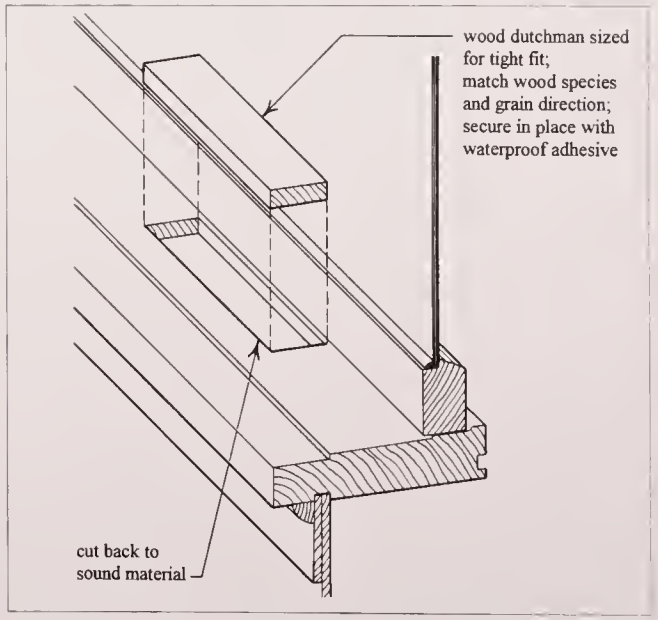
Cut vertical replacement pieces on a diagonal to direct water from the joint. Horizontal joints tend to collect water.

Consolidate deteriorated wood rather than replacing the original, where possible. In some nonstructural locations, such as wood sills, injection of a polymer composite material (such as a flexible epoxy restoration compound that can be carved) is an appropriate means to extend the life of a wood component.

Use galvanized or stainless-steel nails in repair work to reduce metal stains on wood. Where appropriate, countersunk finish nails with wood filler applied over the nailheads also prevent staining.

Use predrilling and screws in old brittle wood rather than nails to minimize cracking and splitting.





The sketches above illustrate the technique for dutchman repair of a deteriorated wood sill.

Recommended

Replace

If the overall form and detailing are still evident, use the physical evidence as a model and replace in kind an entire wood feature that is too deteriorated to repair. Examples of wood features include a cornice, entablature, or balustrade. If using the same kind of material is not technically or economically feasible, a compatible substitute material may be considered.

Where repair and restoration are not possible, match the original wood as exactly as possible in wood species (if not endangered), grain, dimensions, finish texture, and coating. Current dimensions of lumber are often different from historic dimensions; custom milled lumber will probably be necessary.

Replace wood features using the same joining techniques as found in the original feature.

Not Recommended

Removing an entire wood feature that is beyond repair and not replacing it, or replacing it with a new feature that does not have the same appearance.

Replacing milled lumber with plywood. Plywood is both historically inappropriate and visually distinct from historic wood.

Wooden doors are common at the Presidio and are often character-defining features. They are vulnerable to vandalism, impact damage, and moisture, but should be maintained and conserved rather than replaced.

Wood

The plywood door pictured above replaced an original board-and-batten door. Replacement in kind, if the original could not be conserved, is a more appropriate design solution.

Missing paint in the photo above indicates the removal of a pent roof that once shaded the windows from direct sunlight and guided rainwater from the openings. Missing elements such as this should be replaced if there is sufficient documentation to aid in their reconstruction.

Recommended

Design for Missing Historic Features

Design and install a new wood feature, such as a cornice or doorway, when the historic feature is completely missing. It may be an accurate restoration using historical, pictorial, or physical documentation; or an entirely new design, compatible with the size, scale, material, and color of the historic building.

Not Recommended

Creating a false historical appearance because the replaced wood feature is based on insufficient historical, pictorial, or physical documentation.

Introducing a new wood feature that is incompatible in size, scale, material, or color.

Introducing inappropriate materials that mimic historic materials, such as composite shingles or aluminum siding. These are unacceptable because they substantially alter a building's visual characteristics.

Architectural Metals

Architectural metal features are often highly decorative and may be important in defining the overall historic character of the building. These features include cast iron facades, porches, and steps; sheet metal cornices, siding, roofs, roof cresting, and storefronts; and cast or rolled metal doors, window sash, entablatures, and hardware.

Metals commonly used in historic buildings include lead, tin, zinc, copper, bronze, brass, iron, steel, and— to a lesser extent—nickel alloys, stainless steel, and aluminum. Historic metal building components were often created by highly skilled local artisans; by the late 19th century, many of these components were prefabricated and readily available from catalogs in standardized sizes and designs.

Architectural metals at the Presidio can be divided into ferrous (iron) alloys and copper alloys. Ferrous alloys include cast iron, wrought iron, and steel; these are hard metals that rust readily in marine air and must be painted to prevent corrosion. Copper alloys include copper as well as bronze and brass; these relatively soft metals form a natural protective patina and should not be painted.

Both ferrous and copper alloys are used at the Presidio on exteriors and interiors for utilitarian and decorative purposes. Ferrous alloys are the only metals commonly used for structural elements such as cast iron columns and exposed steel trusses. Some specialized wrought iron elements, such as hitching rings in the stable walls, were probably hand-forged by blacksmiths working at the Presidio. However, the majority of metal architectural elements are standardized, 20th-century, factory-made products chosen for their strength, low cost, fire resistance, durability, and ease of assembly.

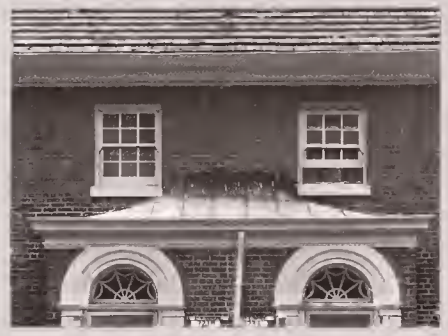
Metals can be associated with a particular architectural style. For example, ferrous metals, painted black, usually appear on the Mission Revival and Mediterranean Revival buildings, in wrought iron balcony rails, grilles, light fixtures, and hardware. In the Colonial Revival buildings copper and copper alloys are more commonly used. Copper flashing, gutters, and leaders, and occasionally copper roofs and light fixtures, are featured on exteriors, while interior elements such as fire screens are often bronze or brass.

Architectural Metals

Metal components are used throughout the large masonry barracks and industrial and warehouse buildings for their fire-resistant properties. Decorative cast-iron interior columns are still in place in the brick barracks, and exterior-mounted iron fire shutters cover openings on the early masonry warehouses. Rolled steel operating parts on skylights and windows and exposed structural elements, such as steel trusses, are key character-defining features of the industrial buildings. Sheet metal has been used at the Presidio for many years; early pressed-metal ceilings (either galvanized steel or zinc) with raised decorative patterns are still in place on the interiors of many older buildings. Galvanized sheet metal siding is used for a number of industrial buildings and some small storage sheds. It is likely that other metals are in place at the Presidio—such as lead, terneplate, stainless steel, and aluminum—but years of overpainting make it difficult to identify these less common metals.

Some early wooden elements, such as porch railings and exterior stairs, have been replaced or augmented over the years with more durable metal elements, which have often gained significance themselves. These include the ubiquitous steel pipe rails painted black, a characteristic feature of many Presidio buildings.

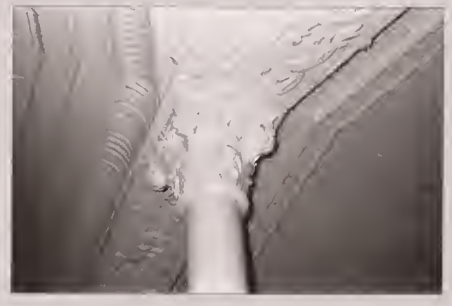
The San Francisco microclimate with its moist salt-laden air is especially harsh on architectural metals. Maintenance is of vital importance and raises several issues related to sustainable design. Historical coatings used to inhibit metal corrosion were rich in lead, which can flake and pollute the surrounding soil and groundwater, and modern substitutes may still pose environmental problems. Chemical products designed to remove paint and corrosion from metals are toxic-laden; abrasive removal methods produce toxic dust, affecting the immediate environment and equipment operators and possibly damaging unprotected adjacent materials. Hand scraping and wire brushing, in conjunction with containment of removed materials, is generally the most environmentally-sound cleaning method. Forging processes, including soldering and welding, may also be very hazardous if the worker is unfamiliar with specific techniques. Many metals are recyclable and may rate highly for sustainability; however, aluminum is not recommended as a replacement metal because it is particularly energy-intensive to produce.



The choice of metal can be made for functional and stylistic reasons. Copper, a durable roofing material, covers the flared porch roof on a Colonial Revival building above. Black wrought iron decorative balcony rails, such as the one at lower left, are typical elements on Mission Revival and Mediterranean Revival style buildings.

Architectural Metals

Iron shutters over window and door openings provided fire protection for early masonry warehouses.



Pressed metal ceilings are still in place in some older Presidio buildings. These are generally galvanized iron, steel, or zinc sheets. Paint buildup can lead to loss of detail. Open seams should be repaired.

Recommended

Identify, Retain, and Preserve

Identify, retain, and preserve architectural metal features—such as columns, capitals, window hoods, or stairways, which are important in defining the overall historic character of the building—and their finishes and colors. Identification is also critical to differentiate between metals prior to work. Each metal has unique properties and requires different treatment.

Identify methods of assembly. Metal features are often assembled from smaller elements bolted, screwed, or welded together. Joints must be sealed to prevent moisture from penetrating to the interior and causing corrosion from within.

Protect and Maintain

Protect and maintain architectural metals from corrosion by providing proper drainage so that water does not stand on flat horizontal surfaces or accumulate in curved decorative features.

Clean architectural metals, when appropriate, to remove corrosion prior to repainting or applying other appropriate protective coatings.

Not Recommended

Removing or radically changing architectural metal features that are important in defining the overall historic character of the building such that the character is diminished.

Removing a major portion of the historic architectural metal from a facade instead of repairing or replacing only the deteriorated metal, then reconstructing the facade with new material to create a uniform or "improved" appearance.

Radically changing the type of finish or its historic color or accent scheme.

Failing to identify, evaluate, and treat the causes of corrosion, such as moisture from leaking roofs or gutters.

Placing incompatible metals together without providing a reliable separation material. Such incompatibility can result in galvanic corrosion of the less noble metal (e.g., copper will corrode cast iron, steel, tin, and aluminum).

Architectural Metals

Recommended

Identify the particular type of metal prior to any cleaning procedure and then test to ensure that the gentlest cleaning method possible is selected, or determine that cleaning is inappropriate for the particular metal.

Clean soft metals such as lead, tin, copper, terneplate, and zinc with appropriate chemical methods, because their finishes can easily be abraded by blast cleaning.

Use the gentlest cleaning methods for hard metals—such as cast iron, wrought iron, and steel—to remove paint buildup and corrosion. If hand scraping and wire brushing are ineffective, low-pressure grit blasting may be used as long as it does not abrade or damage the surface.

Apply appropriate paint or other coating systems after cleaning to decrease the corrosion rate of metals or alloys.

Repaint with colors that are appropriate to the historic building or district.

Apply an appropriate protective coating such as lacquer to any architectural metal feature that is subject to heavy pedestrian use, such as a bronze door.

Not Recommended

Exposing metals that were intended to be protected from the environment.

Applying paint or other coatings to metals that were meant to be exposed, such as copper, bronze, or stainless steel.

Using cleaning methods that alter or damage the historic color, texture, or finish of the metal; or cleaning when it is inappropriate for the metal.

Removing the patina of historic metal. The patina may be a protective coating on some metals, such as bronze or copper, or a significant historic finish.

Cleaning soft metals—such as lead, tin, copper, terneplate, or zinc—with grit blasting, which will abrade the surface of the metal.

Failing to reapply protective coating systems to metals or alloys after cleaning, which accelerates corrosion.

Using new colors that are inappropriate to the historic building or district.

Failing to assess pedestrian use or new access patterns so that architectural metal features are subject to damage by use or by inappropriate maintenance.

As metal corrodes, it expands in volume and exerts tremendous pressure on the surrounding material. Here, corrosion of the metal rails and embedded reinforcing bars has split the concrete posts.

Architectural Metals

Although most architectural metal at the Presidio was mass-produced, there are some handwrought elements like this wrought iron hitching ring on the exterior of a stable. Wrought iron is somewhat more resistant to corrosion than other ferrous metals, and it has not always been historically coated. To minimize potential damage to surrounding masonry, metal elements should be attached through a mortar joint as above rather than through a masonry unit.

Recommended

Evaluate the overall condition of the architectural metals to determine if protection and maintenance are sufficient, or if repair is necessary.

Remove accumulated plant material from metal elements, such as roofs and gutters. Acids from decomposing plants will cause metals to corrode.

Replace deteriorated caulking between assembled components of metal elements to prevent moisture from entering internal voids and causing corrosion.

Strengthen loose metal railings by tightening all bolts and screws. Remove and replace seriously rusted bolts and screws that have stripped threads.

Clean and lubricate or replace in kind missing hinges and fasteners in a timely manner.

Check ferrous metal components biannually; remove and refinish any areas that show corrosion.

Remove all rust before repainting; however, it is usually not necessary to remove paint that is well adhered.

Not Recommended

Failing to undertake adequate measures to protect architectural metal features.

Filling voids in hollow metal balusters, newel posts, and other elements with concrete.

Cleaning or treating metals before checking with the National Park Service to ensure compliance with environmental safety requirements.

Using heat (applied with propane torch or similar device) to remove paint or rust from architectural metal. Localized heat applied to cast iron (such as to a cast iron column) can cause it to shatter. Heat can distort most metals, and intense heat will vaporize the lead in old paint, resulting in highly toxic fumes.

Recommended

Select primer and finish coats that are chemically compatible with the particular metal in question.

Choose a primer that contrasts with the color of the prepared metal surface when treating painted metals to allow the uniform application of coats and easy detection of wear.

Consider whether layers of paint need to be removed to restore crispness to the details of metal features, such as pressed metal ceilings.

Wire brush or hand scrape where paint buildup and rust are not severe. Brushes should be of like metals (such as bronze wool or brass wire for cleaning copper alloys). Steel wire brushes or steel wool can initiate corrosion of copper alloys by depositing minute pieces of iron onto the object.

Protect any adjacent materials—such as masonry, wood, or glass—when using chemical cleaning agents or low-pressure grit blasting, or when repainting architectural metals.

Character-defining hardware has often been removed and replaced with inappropriate substitutes. The original hinges and door pulls on these historic doors were intentionally overscaled and made of a ferrous metal, painted black, consistent with the Mission Revival and Mediterranean Revival styles. The historical character of the door at the lower right has been diminished by painting the original hardware the same color as the door.

Architectural Metals

Metal elements are often made of separate pieces bolted or screwed together. A joint in the post shown above has failed, dangerously weakening the railing and allowing water to collect in the pipe, eventually leading to corrosion from within.

Fragments of historic metal elements such as these mounts for iron window bars, must be retained in place and maintained. If allowed to corrode, they will split the masonry.

Recommended

Repair

Repair architectural metal features by patching, splicing, or otherwise reinforcing the metal following recognized preservation methods. Repairs may also include the limited replacement in kind—or with a compatible substitute material—of those extensively deteriorated or missing parts of features when there are surviving prototypes, such as porch balusters, column capitals, or bases, or porch cresting.

Select metal used for patching or reinforcing that closely matches the original material to prevent galvanic corrosion.

Fill small holes and nonstructural cracks using recognized preservation methods to prevent water penetration to the interior.

Not Recommended

Replacing an entire architectural metal feature, such as a column or balustrade, when repair of the metal and limited replacement of deteriorated or missing parts are appropriate.

Using a substitute material for the replacement part that does not have the appearance of the surviving parts or that is physically or chemically incompatible.

Applying bituminous patching materials, which are visually inappropriate and will initiate corrosion in some metals.

The base of the post shown at right has completely corroded due to pooling water inside the pipe.

Recommended

Replace

If the overall form and detailing are still evident, replace in kind an entire architectural metal feature that is too deteriorated to repair, using the physical evidence as a model. Examples include cast iron porch steps or steel sash windows. If use of the same kind of material is not technically or economically feasible, a compatible substitute material may be considered.

Replace materials in kind; the simple and once-common metal elements used at the Presidio may still be produced, or may be available in local salvage yards. Always use recycled materials before attempting to reproduce the original feature.

Design for Missing Historic Features

Design and install a new architectural metal feature, such as a metal cornice or cast iron capital, when the historic feature is completely missing. It may be an accurate restoration using historical, pictorial, and physical documentation; or a new design compatible with the size, scale, material, and color of the historic building.

Not Recommended

Removing an architectural metal feature that is beyond repair and not replacing it; or replacing it with a new architectural metal feature that does not have the same appearance.

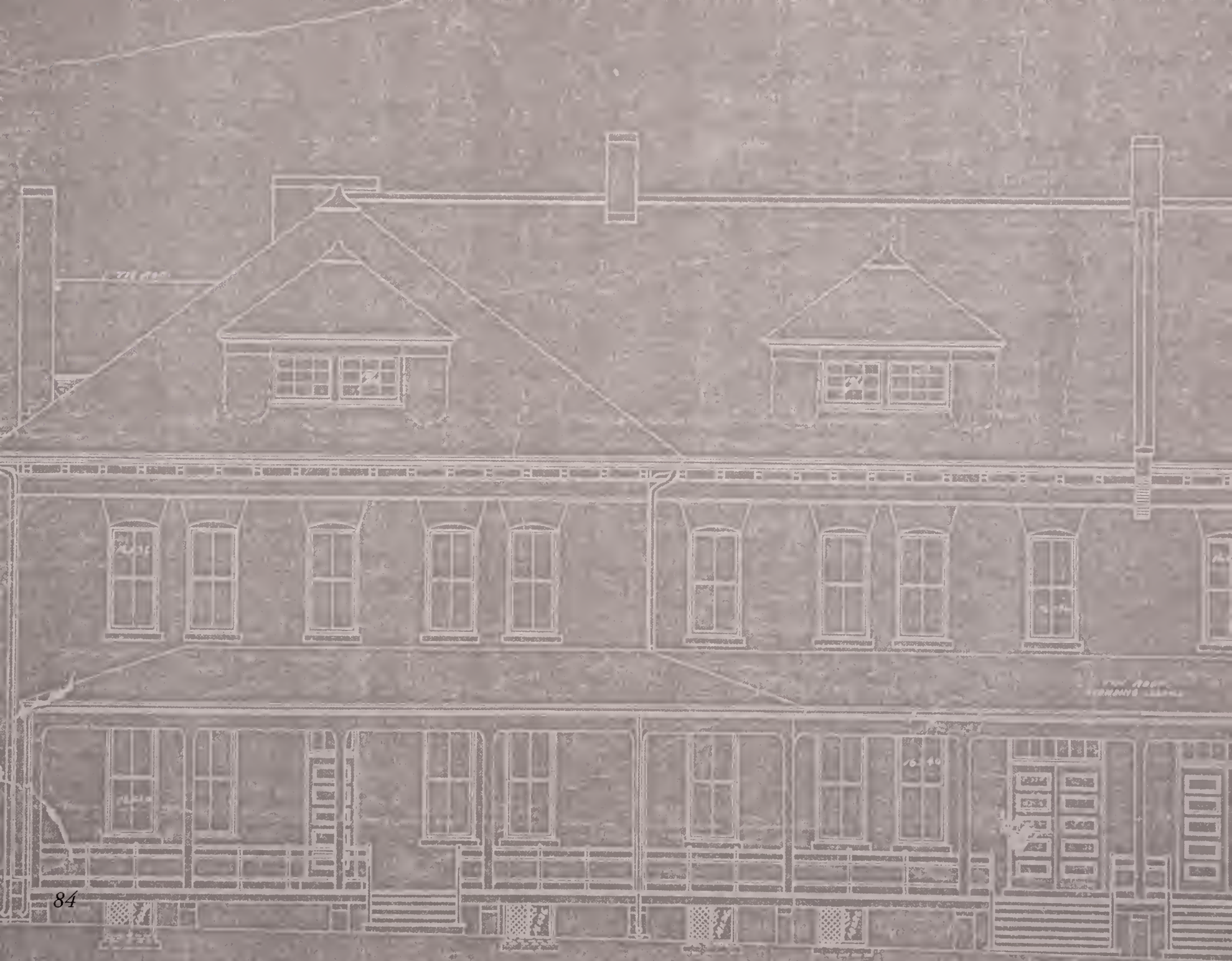
Replacing a metal element with a less durable metal.

Selecting aluminum as a replacement material. Aluminum is usually an inappropriate substitute because it differs from the historic metals in color and dimension. The production of aluminum is particularly energy-intensive, which makes it a poor choice from the sustainable design point of view.

Creating a false historical appearance because the replaced architectural metal feature is based on insufficient historical, pictorial, and physical documentation.

Introducing a new architectural metal feature that is incompatible in size, scale, material, or color.

The replacement rails illustrated above are either hazardous or inappropriate because of color, pipe diameter, or joint detail. In these examples, a round pipe rail consistent with those of the historic period and painted black would have been a more appropriate choice.



Roofs

The roof is an important design element of many historic buildings with its shape; features such as cresting, dormers, cupolas, and chimneys; and the size, color, and patterning of the roofing material. In addition, a weather-tight roof is essential to the long-term preservation of the entire structure. Historic roofing reflects available materials, levels of construction technology, weather, and cost. For example, throughout the country in all periods of history, wood shingles have been used—their size, shape, and detailing differing according to regional craft practices. European settlers used clay tile for roofing as early as the mid-17th century. In some cities, such as New York and Boston, clay was popularly used as a precaution against fire. The Spanish influence in the use of clay tiles is found in the southern, southwestern, and western states. In the mid-19th century, tile roofs were often replaced by sheet metal, which is lighter and easier to maintain. Evidence of the use of slate for roofing dates from the mid-17th century. Slate has remained popular for its durability, fireproof qualities, and decorative applications. The use of metals for roofing and roof features dates from the 18th century, and includes the use of sheet iron, corrugated iron, galvanized metal, tin plate, copper, lead, and zinc. Awareness of these and other traditions of roofing materials and their detailing will contribute to more sensitive treatment.

Sloping red roofs are a distinctive unifying feature at the Presidio. Roofs are often viewed from above and have taken on a particularly important role in defining the landscape. They illustrate the prevailing Army designs of standardized housing, administrative, and support structures. Over time, a variety of materials has been employed, corresponding to technological and stylistic developments in civilian construction.

The earliest extant Presidio buildings date from 1860 to 1880 and have gable roofs with overhanging eaves and boxed cornices, usually symmetrical, sometimes with a central gable crossing the main roof line. Most Presidio buildings of this period have been reroofed with red composition shingles; originally, the majority had wood shingle roofs. The remainder had clay tile or slate roofs which were replaced due to failure or fire hazard.

The Colonial Revival (ca. 1895–1920) brought a variety of roof forms, including gabled, hipped, and gambrel, and some decorative elements such as brackets, modillions, and shaped rafter tails. Some buildings combine hipped roofs with cross-gabled elements.

Roofs

With the Mission Revival, beginning around 1890, clay tile and red composition shingles imitating tile became the dominant roofing materials at the Presidio. Tile predominates in subsequent styles as well, including the Italian Renaissance Revival and even some later Colonial Revival buildings. Detailing and tile shapes differ according to the period; buildings in the Mission Revival style have gabled roofs with scrolled or stepped gable ends, while Renaissance Revival buildings usually feature hipped roofs with wide overhangs supported by decorative brackets. These roof styles, with eclectic variations, predominated until the 1940s.

Utilitarian buildings at the Presidio such as hangars and maintenance structures reflect similar stylistic influences. Most of these buildings have gabled roofs, red composition roofing, and skylights or monitors to allow light into large interior spaces. Some larger buildings were constructed with flat or nearly flat built-up roofs with minimal overhangs and few decorative details. Likewise, some of the minor service structures, utility vaults, etc. are flat or shed roofed.

The majority of the Presidio's buildings were constructed to standardized Army plans. However, individual buildings exhibit interesting stylistic combinations, such as flared metal-roofed porches or rolled-edge Shingle style dormer roofs added to Georgian Revival buildings. Elements of the drainage system such as gutters and downspouts are significant features, although in most cases are utilitarian in design.

When an action is contemplated on a Presidio roof, several points should be considered:

- The Presidio's roofscape is an important component of the landscape. The dominant type is a red sloping roof, with many variations.

- Many of the Presidio's early slate and tile roofs were replaced with composition shingles, which may by now also be significant, but may be nearing the end of their lifespan.

- The Presidio lies in an active seismic zone. Roofs on many of its older buildings exhibit serious seismic deficiencies in unsupported character-defining features such as chimneys and cupolas, and in the lack of shear-resistant diaphragms or connections.

- While roofs are well-maintained in general, many past repairs have been somewhat haphazard and some roofs show signs of deterioration, most often due to failure of the drainage system, poor maintenance, and poor detailing of successive additions and reroofing.

This roof was probably originally slate, but has since been reroofed with red composition shingles. Restoration of the roof to its original materials may not be appropriate if subsequent roof changes have acquired significance.

This late 19th-century building exhibits the restrained classical detailing of many Presidio buildings. The roofing originally may have been slate, but with its later composition shingles, it has become part of the dominant red roofscape.

Roofs

Examples of several unique Presidio roof forms appear in the building above: the gambrel roof of the main house and the flared hipped roof with the cupola on the garage. Antennas are often unfortunate but removable additions. Placement of such equipment must be carefully planned.

Gutters and downspouts provide an integral function of a roof. Lack of attention to these elements, as seen here, greatly contributes to building deterioration.

The extensive replacement of roofing materials at the Presidio has eliminated much original fabric; however, many buildings retain their roof form and detailing. Later roofing, where it was carefully detailed and installed, has also acquired significance. Roofs have also been negatively impacted by the haphazard addition of new rooftop elements such as antennas, mechanical equipment, solar collectors, and elevator penthouses. Many roofs also have several layers of roofing materials; the additional weight may ultimately cause structural problems.

As the primary protective cover of a building, the roof plays a major role in sustainable design. Maintenance of both the roof itself, and more importantly, its drainage system, is the most significant factor in assuring the long-term sustainability of the building as a whole, by protecting other building materials and systems from exposure and water infiltration. The energy-conserving performance of many roofs may be significantly enhanced with the addition of insulation. When well maintained, tile and slate roofs have extremely long lifespans; the life of composition roofs should also be maximized by using the best quality products when replacement is necessary. Materials selected for roof drainage systems should be as long-lived as the roofing material itself. Insulating and roofing materials should pose no hazards to the environment, and roofing materials should be recycled where possible or stockpiled for later reuse. The use of existing skylights and clerestories for both natural lighting and ventilation is encouraged; new skylights, carefully located, may in some cases be appropriate.

Roofs

Recommended

Identify, Retain, and Preserve

Identify, retain, and preserve roofs—and their functional and decorative features—that are important in defining the overall historic character of the building. Important features include the roof's shape, which may be hipped, gabled, gambrel, or mansard; decorative features such as cupolas, cresting, chimneys, and weather vanes; and roofing materials such as slate, wood, clay tile, and metal, as well as the roof's size, color, and patterning.

Consider roofing as a system of combined components, from the ridge to splash blocks, including the underlying sheathing and structure. Every element of the roof should be considered as an integral part of the whole.

Maintain elements that unify buildings into groups, such as similar roofs. Most Presidio buildings form a part of a cluster or group, and roofs may be an important unifying feature. This unity must be maintained when any replacement, repair, or alteration work takes place on one or more buildings in the group.

Preserve the Presidio's overall roofscape character, with its red roofs, dormers, monitors, chimneys, and other features as an entity in its own right.

Use all available information, including physical evidence and investigation, to determine what roof features are character-defining. Little detailed pictorial documentation is available for most Presidio roofs. Observation of buildings constructed at one time as part of a group may provide important comparative information.

Not Recommended

Radically changing, damaging, or destroying roofs which are important in defining the overall historic character of the building such that the character is diminished.

Removing a major portion of the roof or roofing material that is repairable, then reconstructing it with new material in order to create a uniform, or "improved" appearance.

Changing the configuration of a roof by adding new features such as dormer windows, vents, or skylights such that the historic character is diminished.

Stripping the roof of sound historic material such as slate, clay tile, wood, or architectural metal.

Applying paint or other coatings to roofing material which historically has been uncoated.

Changing material types, such as replacing a historic clay tile roof with red composition shingles.

Removing roof materials when undertaking seismic repairs to a building without considering, and carefully documenting, the historic features of the roof.

The roof on this building has many elements that combine to give it character; the red shingled surface; the dormers, chimneys, and ventilators; and the cornice detail at the gable end are all significant features. Relatively unobtrusive skylights have been added.

Roofs

When this roof was changed from slate to composition shingles, the terra cotta coping on its firewalls was retained. Significant features such as these should always be preserved when roof work is undertaken.

This tall chimney has been strapped as a stabilizing measure, but further strengthening will be required for seismic safety.

Recommended

Evaluate the existing condition of roofs in consideration of their important role in the seismic strength of a building. Many older Presidio buildings have serious problems in this area: weak connections with walls below, poor behavior as a diaphragm, and unsupported parapets or rooftop ornaments. These need to be analyzed and corrected in order to ensure the buildings' continued survival.

Protect and Maintain

Protect and maintain a roof by cleaning the gutters and downspouts and replacing deteriorated flashing. Roof sheathing should also be checked for proper venting to prevent moisture condensation and water penetration; and to ensure that materials are free from insect infestation.

Provide adequate anchorage for roofing material to guard against wind damage and moisture penetration.

Protect a leaking roof with plywood and building paper until it can be properly repaired.

Regularly inspect and clean gutters. Parts of the Presidio are heavily forested, and accumulation of plant debris in gutters can be a serious problem. Protective screens may need to be installed in some locations.

Not Recommended

Failing to clean and maintain gutters and downspouts properly so that water and debris collect and cause damage to roof fasteners, sheathing, and the underlying structure.

Recommended

Provide support for parapets, finials, chimneys, and other rooftop elements.

Protect building features such as overhanging eaves and decorative brackets with netting or other repellent systems against birds and other animals, as necessary.

Regularly inspect and clean internal drainage systems. Leaks can cause serious damage to building structures and interior finishes.

Install unobtrusive removable weatherproof caps over unused fireplace chimneys and service chimneys to protect them from water, debris, and animals.

Not Recommended

Allowing roof fasteners such as nails and clips to corrode so that roofing material is subject to accelerated deterioration.

Permitting a leaking roof to remain unprotected, allowing accelerated deterioration of historic building materials—masonry, wood, plaster, paint, and structural members.

Permitting any break in the protective surface provided by the roof to remain unprotected. The Presidio's microclimate is frequently damp and windy, and deterioration can occur rapidly.

Removing important roofscape elements such as chimneys.

The eaves under this roof exhibit several common problems: accumulation of debris in gutters, a deteriorated gutter, and missing downspout. Poor roof and gutter maintenance has probably caused damage to the wood and stucco surfaces and perhaps to the structure as well.

The leaves lying on this roof will retain moisture and damage the roof.

Roofs

Built-up roofs at the Presidio are generally newer, except for porch and portico roofs such as this one. Lack of maintenance of the wood balustrade has resulted in loss of material and water penetration, and may have damaged interior spaces.

Built-in gutters are particularly vulnerable to deterioration. Because they are within the roof or wall structure, their deterioration can go unnoticed until it leads to serious problems, such as rotting wood.

Recommended

Repair

Repair a roof by reinforcing the historic materials which comprise roof features. Repairs will also generally include limited replacement in kind—or with compatible substitute materials—of extensively deteriorated or missing parts of features when there are surviving prototypes such as cupola louvers, dentils, and dormer roofing; or slates, tiles, or wood shingles on a main roof.

Use only compatible metals, or proper isolating methods, in making roof repairs; galvanic action can cause deterioration of metal roofing, fasteners, and flashing.

Inspect built-in gutters frequently; they are vulnerable to leaks due to building movement. Patching should be done when necessary with an appropriate, flexible, UV-resistant material. Asphalt patches should be removed and proper repairs made.

Repair historic flashing in kind where possible. Flashing failure is a frequent cause of leaks and damage to the roof structure and the building interior, as well as to exterior masonry.

Repair damaged, disconnected, and missing gutters and downspouts.

Not Recommended

Replacing an entire roof feature such as a cupola or dormer when repair of the historic materials and limited replacement of deteriorated or missing parts are appropriate.

Failing to reuse intact slate or tile when only the roofing substrate needs replacement.

Using a substitute material for the replacement part that does not convey the visual appearance of the surviving parts of the roof or that is physically or chemically incompatible.

Overloading the roof support system when repairing or replacing roof elements, when performing seismic strengthening, or introducing new elements such as antennas or mechanical equipment.

Patching a tile roof with tar, mastic, metal, or other inappropriate material.

Patching a built-in gutter with asphalt, which cracks with movement and corrodes some metals.

Undertaking roof repair without assessing the condition of underlayment and structure below. Making repairs to damaged interior surfaces prior to resolving roof problems.

Recommended

Replace

Replace in kind an entire feature of the roof that is too deteriorated to repair—if the overall form and detailing are still evident—using the physical evidence as a model to reproduce the feature. Examples can include large sections of roofing, or a dormer or chimney. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.

Use existing historical sources and physical evidence to determine the details of a deteriorated feature. Many Presidio buildings were constructed as groups of identical structures, and provide examples that can serve as models for replacing the feature.

Replace a seriously deteriorated roof in conjunction with necessary seismic repairs to the underlying structure.

Replace roofing material (such as slate, clay, or tile), when partial replacement of a historic roof is required, with material that matches the original in color, texture, pattern, profile, and dimension. Potential sources for replacement material should be considered early in a project to allow for delivery time. Salvaged material should be used for replacement whenever possible.

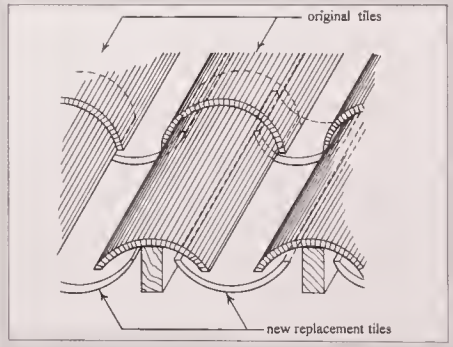
Not Recommended

Removing a feature of the roof that is beyond repair, such as a chimney or dormer, and not replacing it; or replacing it with a new feature that does not have the same appearance.

Replacing built-in gutters or internal downspouts with new gutters at roof edge or exterior downspouts.

Replacing copper or lead flashing with galvanized sheet metal or other material.

Clay tile roofing, while very durable, may be damaged due to impact or deterioration of substrate and fasteners. This roof can be preserved by repairing its substrate and fasteners as needed, and by selectively replacing damaged tiles.



In most cases, replacement tiles should be located on rear-facing roof surfaces. In the case of the barrel tiles shown here, place new tiles on the bottom and original tiles on top, as the top ones are more visible and will match the color and texture of the rest of the roof.

Roofs

The roof on this stables building was recently restored to its original slate finish. The roof monitor retains its original operable windows, which provide both light and ventilation for the interior. Copper gutters and downspouts were also restored.

Recommended

Locate replacement tiles on rear-facing or inconspicuous roof surfaces, and reuse original tiles in prominent locations.

Carefully record details and retain ornamental elements when replacement of roofing is necessary. Salvage removed materials.

Number or group clay tiles so they may be reinstalled in their original location and pattern when replacing tile fasteners (clay tile normally has a longer lifespan than its fasteners).

Construct all new roofs of the best quality materials available, to ensure long life and low maintenance. Built-up and composition roofing have limited lifespans. Roofs should also conform to principles of sustainable design, making use of recycled, nontoxic, locally produced materials whenever possible.

Use metals for flashing, gutters, and downspouts that are compatible in quality and longevity with roofing materials, such as copper with clay tile.

Introduce or increase insulation where possible at the time of reroofing. All new work should attempt to improve the building's thermal performance.

Recommended

Design for Missing Historic Features

Design and construct a new feature when the historic feature such as chimney or cupola is completely missing. It may be an accurate restoration using historical, pictorial, and physical documentation; or a new design that is compatible with size, scale, material, and color of the historic building.

Compare a building with other similar buildings when possible to determine what original historic features are missing, and use them as models for reconstruction of original elements.

Replace composition roofs with different materials only when the composition roofing is not historically significant and when there is clear evidence of the original materials and details. Replacement material and detailing should be based on historic research and an understanding of the physical history of the building. Many clay tile roofs, and a smaller number of slate roofs, have been replaced with red composition roofs. Research will be necessary to determine when the replacement took place and whether the composition roofing is now a historic feature in its own right. The National Park Service will assist in identifying appropriate roofing material for each building group.

Verify historic roofing using physical evidence, such as construction shadows. If there is no clear evidence of the original roofing material or if a later roofing material has gained significance, material should be replaced in kind.

Not Recommended

Creating a false historical appearance because the replaced feature is based on insufficient historical, pictorial, and physical documentation.

Introducing a new roof feature that is incompatible in size, scale, material, or color.

Assuming that buildings of a particular period always have similar details. At the Presidio, several styles were often popular during a single period, and buildings often combined elements of several styles, i.e., Mission/Italian Renaissance Revival or Colonial/Mediterranean Revival. Careful documentation is necessary before reintroducing any apparently missing feature.

Early ventilators such as the one shown above were modest in scale and often custom-designed to enhance the roofscape. Newer rooftop ventilating equipment is frequently larger and designed with little attention to a particular building's historic appearance. Nonhistoric equipment should be placed in inobtrusive locations.

Roofs

This rooftop addition is visible from several vantage points and also obscures a historic window. If rooftop structures are necessary to accommodate elevators, stairs or mechanical equipment, they should be carefully designed and placed as inconspicuously as possible.

Recommended

Alterations/Additions for New Use

Install required mechanical and service equipment on the roof such as air conditioning, transformers, or solar collectors when required for the new use so that they are inconspicuous from the public right-of-way and do not damage or obscure character-defining features.

Design additions to roofs such as residential, office, or storage spaces; elevator housing; decks or terraces; or dormers or skylights when required so that they are inconspicuous from the public right-of-way and do not damage or obscure character-defining features.

Plan for new equipment in the context of the overall roofscape and the unusual Presidio topography; most buildings can be seen from many vantage points, including from above. This complicates the task of locating equipment in inconspicous locations.

Locate equipment in another location when an inconspicuous location on a roof is not possible.

Design the roof of any addition to a historic building to be compatible in form, materials, and details with the historic roof, but also to be recognizable as a modern addition. When a new element, such as a solar collector or antenna must be added to a roof, install it in such a way as to be reversible.

Not Recommended

Installing mechanical or service equipment so that it damages or obscures character-defining features, or is conspicuous from the public right-of-way.

Radically changing a character-defining roof shape or damaging or destroying character-defining roofing material as a result of incompatible design or improper installation techniques.

Assuming that the normally simple roof features of utilitarian buildings can be altered. Such features are character-defining and although utilitarian buildings are frequently good candidates to be adaptated to new uses, their original qualities should be maintained.

Raising a roof to add floor area or volume to a building. This is generally unacceptable.

Windows

Technology and prevailing architectural styles have shaped the history of windows in the United States, starting in the 17th century with wooden casement windows having tiny glass panes seated in lead cames. From the transitional single-hung sash in the 1700s to the true double-hung sash later in the same century, these early wooden windows were characterized by the small panes, wide muntins, and the way in which decorative trim was used on both the exterior and interior of the window. As the sash thickness increased by the turn of the century, muntins took on a thinner appearance as they narrowed in width but increased in thickness according to the size of the window and design practices. Regional traditions continued to have an impact on the prevailing window design, such as with the long-term use of "French windows" in areas of the deep South.

Changes in technology led to the possibility of larger glass panes so that by the mid-19th century, two-over-two panes (or lights) were common; the manufacturing of plate glass in the United States allowed for dramatic use of large sheets of glass in commercial and office buildings by the late 19th century. With mass-produced windows, mail order distribution, and changing architectural styles, it was possible to obtain a wide range of window designs and light patterns in sash. Popular versions of Arts and Crafts houses constructed in the early 20th century frequently utilized smaller lights in the upper sash set in groups or pairs of casement windows. In the early 20th century, the desire for fireproof building construction in dense urban areas contributed to the growth of a thriving steel window industry along with a market for hollow metal and metal-clad wooden windows.

As one of the few parts of a building serving as both an interior and an exterior feature, windows are nearly always an important part of the historic character of a building. In most buildings, windows also form a considerable amount of the historic fabric of the wall plane and thus are deserving of special consideration in a rehabilitation project.

With minor variations, only a few window types and styles are used consistently in all buildings at the Presidio. The multi-paned, double-hung wood window, and the steel industrial sash, make up the fenestration on the majority of Presidio buildings. Casement windows are rare. The earliest extant residential buildings at the Presidio have six-over-six wood double-hung windows. Two-over-two windows are commonly found on larger buildings of most periods. Variations, including four-over-four, four-over-eight, eight-over-eight, nine-over-nine, and even six-over-two and other unusual combinations, are also part of the Presidio window vocabulary; fixed windows are frequently multi-lighted as well.

Windows

Some generalizations may be made about windows and fenestration at the Presidio:

- Wood double-hung and steel industrial sash predominate.
- Windows, frames, and trim reflect the dominant styles of each period, but tend to be modest in scale and simple in detailing.
- Fenestration is generally regular and symmetrical.
- The use of daylight is an important feature of many interiors.
- Industrial buildings frequently employ roof monitors and clerestories to admit natural light into large open spaces.

Distinctive features such as bay windows and leaded or stained glass glazing are found on a few 19th- century houses and in the chapels. Colonial Revival buildings often have features such as Palladian windows in their gable ends, while those of the Mission Revival may have quatrefoil or star-shaped attic windows. Brick buildings of all periods tend to be somewhat richer in detailing, frequently including such window features as segmented molded heads, stone architraves, and stone or cast stone sills.

Stylistically, early porch enclosures resemble the original fenestration, with wood frame, divided light, and glazed infill panels. Some later enclosures are less sympathetic to the scale and materials of the original fenestration.

Some window sash replacement has occurred at the Presidio, primarily evident in the change from multi-light, small-paned windows to single-paned or two-over-two sashes. Fortunately, there has been little replacement of historic windows with aluminum ones, an "upgrade" commonly found on civilian buildings. Wood and steel windows have been fairly well-maintained; one common problem results from perhaps too much attention—paint buildup interfering with the operation of the sashes. Likewise, frequent painting has rendered some historic hardware nonfunctional on the interior. In some cases hardware has been entirely removed and the window fixed shut, or replaced with new, often inappropriate, elements.

Most Presidio buildings, regardless of size and use, are characterized by regular, simply ornamented fenestration. Double-hung wood windows are the most common type.

This bay window is an example of one of the more ornamental fenestration elements at the Presidio. Its six-over-six sashes and slender muntins are typical of early windows at the Presidio.

Windows

Steel industrial sash is the second most common type of fenestration at the Presidio. Buildings such as this one benefited from the quantity of natural light allowed by the large expanses of steel-framed glazing.

Windows provide character not only to a building's exterior facades but also to its interior spaces, by admitting natural light, framing views, and providing architectural features.

Window sashes have often been removed or altered for the installation of fans, vents, or unit air conditioners. The Presidio's microclimate has not made the addition of storm windows necessary, but exterior insect screens have been installed on selected windows in both residential and nonresidential buildings. All of these alterations and additions appear to have been performed as needed, without uniform standards for location or design.

The primary cause of window deterioration is rain driven against and into windows, and standing water on sills. At the Presidio, this condition is exacerbated by extended periods of damp weather, which prevent windows from drying out and encourage expansion and rot. Movement due to seismic activity and settlement over the years, paint buildup, broken glazing, deteriorated putty, and in some cases interior condensation, also contribute to window deterioration.

Windows admit light and air to a building. In considering sustainability, both of these functions must be maximized, but in a controlled manner. Admitting natural light to all spaces, while limiting ultraviolet radiation and excessive heat gain through the use of appropriate shading devices, is one important step. Weather stripping and regular maintenance will also increase thermal efficiency. In some cases, the installation of insulating or low-E glazing or glass-applied film may be an appropriate energy-saving device. The Presidio's climate rarely requires air conditioning; well-maintained, operable windows will be an important and preferred component in creating an efficient ventilating system for most buildings. Replacement windows and components, when required, should be constructed of environmentally sound materials of the highest quality.

Recommended

Identify, Retain, and Preserve

Identify, retain, and preserve windows—and their functional and decorative features—that are important in defining the overall historic character of the building. Such features can include frames, sash, muntins, glazing, sills, heads, hood molds, paneled or decorated jambs and moldings, and interior and exterior shutters and blinds.

Conduct an in-depth survey of the conditions of windows early in rehabilitation planning so that repair and upgrade methods and possible replacement options can be fully explored.

Consider a window's place as a component of the principal exterior facade and its contribution to an interior space when determining its historic significance.

Preserve all remaining original glazing. Historic glass often has distortions and imperfections that are not found in modern glass; consequently, historic glazing is often a character-defining element. Some Presidio buildings may still have original pressed, textured, tinted, stained, or early wire glass.

Not Recommended

Removing or radically changing windows which are important in defining the historic character of the building such that the character is diminished.

Changing the number, location, size, or glazing pattern of windows, through cutting new openings, blocking in windows, or installing replacement sash that does not fit the historic window opening.

Changing the historic appearance of windows through the use of inappropriate designs, materials, finishes, or colors which noticeably change the sash, depth of reveal, or muntin configuration; the reflectiveness and color of the glazing; or the appearance of the frame.

Obscuring historic window trim with metal or other material. Stripping windows of historic material such as wood, cast iron, or bronze.

Replacing windows solely because of peeling paint, broken glass, stuck sash, or air infiltration. These conditions, in themselves, are not indications that windows are beyond repair.

Sometimes significant window features, such as these double security bars, should be preserved even when the building's new use does not require them or might benefit from their removal (more natural light, improved view, etc.).

The Presidio's few examples of historic, character-defining decorative glass, such as the leaded glass window above, should be preserved in place.

Windows

The windows of some utilitarian buildings have not been maintained as well as those of more important structures. The water-caused problems seen here—corrosion of steel, spalling of surrounding material, damage due to vegetation—are typical in less prominent locations.

Some glazing has been painted for daylight control. The use of shades, curtains, or other removable devices is preferred. Maintenance of historic hardware in operating condition is also important.

Recommended

Maintain or restore the mechanical means for operating industrial sash in clerestories or other inaccessible locations where possible. If new, automated means are required, the original system should be left in place.

Carefully balance a window's role in energy conservation and its historic significance.

Preserve transoms in operable condition. Transoms are frequently character-defining features of corridors and interior spaces, providing natural light and ventilation to such spaces.

Protect and Maintain

Protect and maintain the wood and architectural metal that comprise the window frame, sash, muntins, and surrounds, through appropriate surface treatments such as cleaning, rust removal, limited paint removal, and reapplication of protective coating systems.

Make windows weather tight by recaulking and replacing or installing weather stripping. These actions also improve thermal efficiency.

Not Recommended

Removing any existing textured, leaded, curved, colored, or early wire glass.

Blocking or covering interior transom windows because building uses change.

Failing to provide adequate protection of materials on a cyclical basis such that deterioration of the windows results.

Retrofitting or replacing windows rather than maintaining the sash, frame, and glazing.

Failing to undertake adequate measures to ensure the protection of historic windows.

Recommended

Evaluate the overall condition of materials to determine whether more than protection and maintenance are required, i.e., whether repairs to windows and window features are needed.

Keep glazing clear to maximize the natural light source.

Preserve operating systems for historic windows, (e.g., weights on double-hung windows), repairing or replacing components as needed.

Repair all broken or missing glass immediately, as it can allow entry of water, pests, and vandals.

Where code requires, install safety or wire glass into existing window sashes, carefully retaining frame and hardware components. Salvage original glass for later reinstallation or use elsewhere in the building. Where irreversible damage to significant historic elements would occur, refer to the State Historic Building Code for alternative means of mitigating fire hazards.

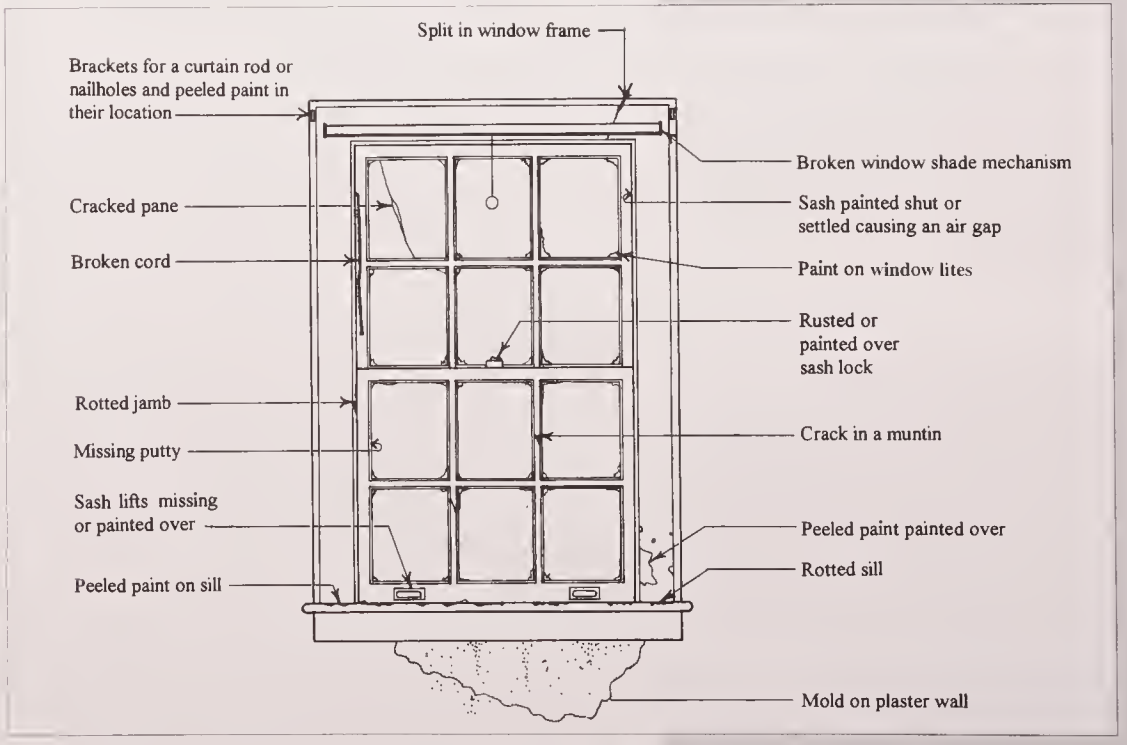
Remove rust and paint from steel windows by hand scraping. Sandblasting may be used to remove heavy corrosion, with careful protection of glass and surrounds.

Not Recommended

Painting over windows, skylights, or clerestories to limit the entry of daylight for the new building use.

Using heat to remove rust or paint from metal windows; this can distort the metal members and release toxic fumes.

The accumulation of water on a sill is one of the primary causes of window deterioration. Modifying the sill's design by sloping it and adding a drip cut along its lower edge will frequently solve the problem. When damage has extended up into the frame or sash, repair or replacement of the window component may also be necessary, though the entire window may not need to be replaced.



Principal locations of common types of deterioration of wood windows. (Interior view.)

Windows

Windows have been painted over to accommodate the needs of building occupants. This may result in negative, long-term irreversible effects; interior blinds or shades can be used effectively to limit the entry of natural light when necessary. Note also the many undesirable window modifications seen on this facade.

A poorly detailed sill has allowed rainwater to collect and severely corrode the bottom of this steel window. The deterioration probably extends through to the interior. Extensive repair or replacement of part or all of the sash and frame will be required.

Recommended

Consider using interior or exterior shutters or blinds with existing windows, as a means of improving a building's energy performance. These should be used only when appropriate to the building and should be fully reversible. Curtains are suitable reversible shading devices in many cases.

Consider the use of storm windows, installed on the interior, when their impact on historic interior features would be minimal and reversible.

Repair

Repair window frames and sash by patching, splicing, consolidating, or otherwise reinforcing. Such repair may also include replacement in kind of those parts that are extensively deteriorated or missing, when there are surviving prototypes such as architraves, hood molds, sash, sills, and interior or exterior shutters and blinds.

Repair defective sills to permit positive drainage. Poor design of the exterior window sill is a frequent problem; window deterioration usually begins on horizontal surfaces and at joints where water collects, saturating wood and corroding steel.

Not Recommended

Replacing an entire window when repair of materials and limited replacement of deteriorated parts are appropriate.

Failing to reuse serviceable window hardware such as brass sash lifts and sash locks.

Using substitute material for the replacement part that does not have the appearance of the surviving parts of the window or that is physically or chemically incompatible.

Recommended

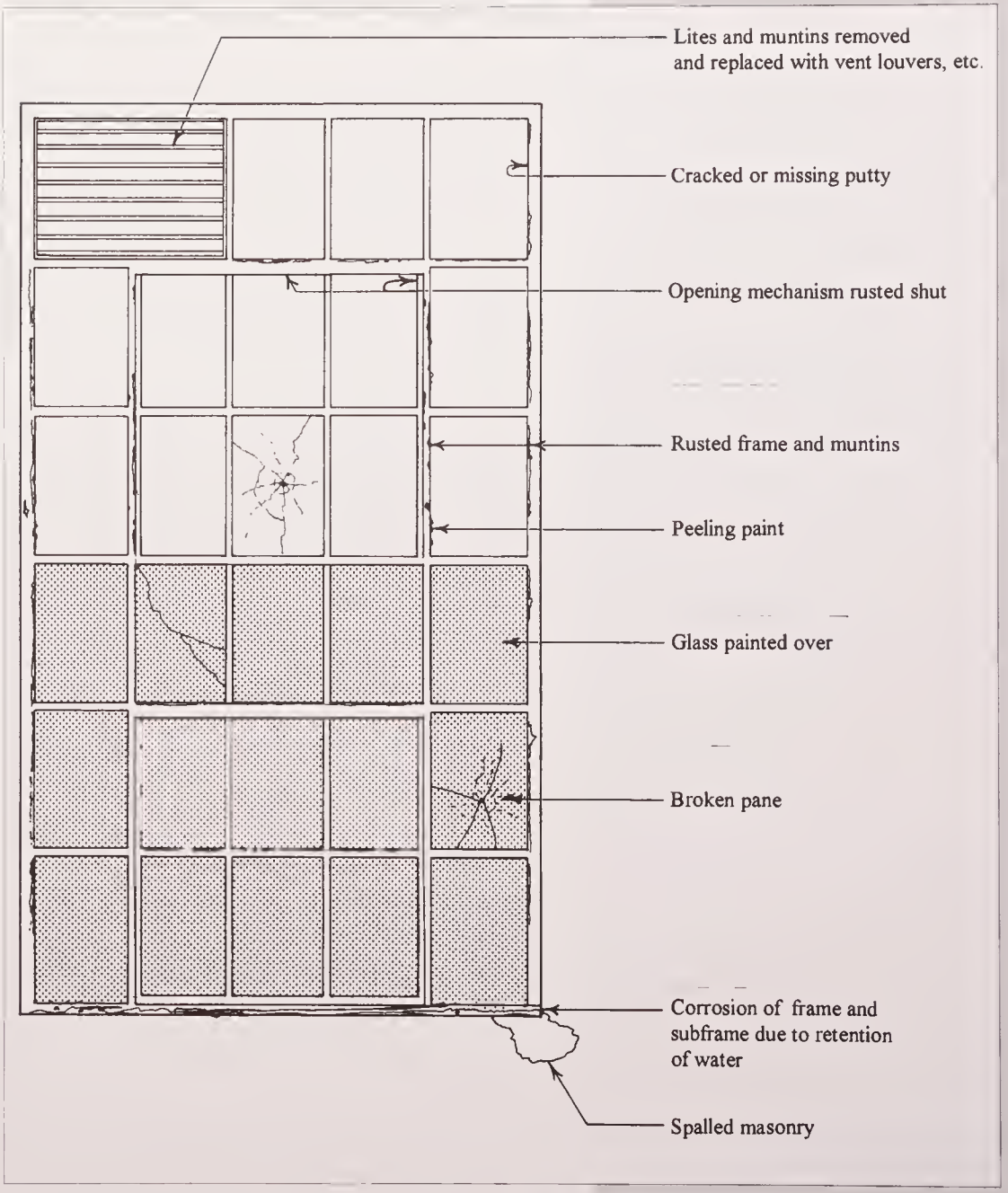
Repair of historic windows is always preferred to replacement. Usually the sill must be replaced first, then lower sash parts. Splicing can be an effective method of repairs for both wood and steel window elements.

If replacement is required, limit it to severely deteriorated components.

Clean and oil hardware that has been painted over; in most cases, repair, rather than replacement, should be possible.

Remove paint from painted skylight and clerestory glazing. Remove built-up paint that causes sashes to be inoperable.

Remove earlier repairs that have been insensitive to the historic features and materials, and repair according to accepted standards.



Principal locations of common types of deterioration of steel windows. (Exterior view.)

Windows

The insertion of a fan and the addition of security screening have radically altered this window's appearance. However, the frame and lower sash remain, and the upper sash could be restored.

Recommended

Replace

Replace in kind an entire window that is too deteriorated to repair, using the same sash and pane configuration and other design details. If the same kind of material is not technically or economically feasible, a compatible substitute material may be considered. For example, on certain types of large buildings, particularly high-rises, aluminum windows may be a suitable replacement for historic wooden sash provided wooden replacement windows are not practical and the design detail of the historic windows can be matched.

Aluminum replacements on historic buildings should include the following components: historic color duplication, texture, or finish that duplicates the original material; incorporation of either an integral muntin or 5/8 inch-deep trapezoidal exterior muntin grids, where applicable; retention of the same glass-to-frame ratio; matching the historic reveal; and duplication of the frame width, depth, and such existing decorative details as arched tops.

Not Recommended

Removing a character-defining window that is beyond repair and blocking it in; or replacing it with a new window that does not have the same appearance.

Replacing historic windows simply to enhance the energy conservation performance of a building.

Recommended

Always keep replacement to a minimum. Where sash replacement is called for, attempt to retain the window frame, hardware, and trim.

Replacement may be the only feasible option when substantial structural damage to a window has occurred. Choose a replacement window with particular care. Ideally the new window should be an exact match of the old one. If this is not possible, carefully consider all of the window's characteristics, both interior and exterior, and its importance in the facade, when selecting a replacement.

Design for Missing Historic Features

Design and install new windows when the historic windows (frames, sash, and glazing) are completely missing. The replacement windows may be an accurate restoration using historical, pictorial, and physical documentation; or they may be a new design that is compatible with the window openings and the historic character of the building.

Reconstruct and install new exterior awnings, shutters, or blinds when historic documentation gives adequate evidence of their previous existence.

Restore windows that were blocked in or boarded up after the historic period, where possible, and where adequate documentation exists.

Not Recommended

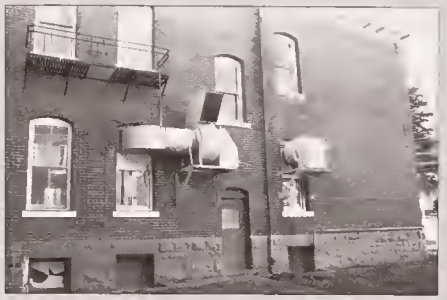
Creating a false historical appearance because the replaced window is based on insufficient historical, pictorial, or physical documentation.

Introducing a new design that is incompatible with the historic character of the building.

Reopening blocked-up windows and reconstructing new windows without adequate historic documentation. Some windows may have been blocked during the period of significance. If the period of significance is now character-defining, the windows should not be reopened.

This building has several altered windows. Because the building is one of a group of similar buildings, and there is clear evidence of the original window style, form, materials, and color, reconstruction of the altered windows is appropriate.

Windows



The location of functions within a building should be carefully planned with respect to necessary ventilation and other equipment. It is preferable to use existing openings for penetration. Windows may be used if original sashes are retained; however, in the building shown above the mechanical ductwork is obtrusive, poorly integrated, and damaging to the historic windows. Although located on the rear facade, this work is highly visible, and considering the building's significance, it is an unacceptable alteration.

Recommended

Alterations/Additions for the New Use

Design and install additional windows on rear or other non–character-defining elevations if required by the new use. New window openings may also be cut into exposed party walls. Such designs should be compatible with the overall design of the building, but not duplicate the fenestration pattern and detailing of a character-defining elevation.

Provide a setback in the design of dropped ceilings when they are required for the new use to allow for the full height of the window openings.

Consider the effect of any interior changes on historic windows and trim, and the appearance of these changes from outside the building (as seen through windows).

Assess existing fenestration. Some of the utilitarian Presidio buildings do not have adequate fenestration for human occupancy. Additional fenestration may be appropriate if carefully located in secondary facades, placed on roofs, or incorporated into existing door openings.

Not Recommended

Installing new windows, including frames, sash, and muntin configurations, that are incompatible with a building's historic appearance or obscure, damage, or destroy character-defining features.

Inserting new floors or furred-down ceilings which cut across the glazed areas of windows so that the exterior form and appearance of the windows are changed.

Planning for a new building use that will require the addition or blocking of windows on primary facades or in any locations that will compromise the building's historic character.

Constructing new interior walls, partitions, or floors that intersect windows, damaging their historic fabric on the interior, and creating a negative impact on the windows' appearance from the exterior.

Removing historic windows partially or completely or damaging them to install through-wall mechanical equipment, vents, etc.

Recommended

Consider an appropriate solution where noise is a problem. Weatherization, maintenance of windows, and the installation of curtains or interior shutters will alleviate some noise, but in some locations and for certain uses, additional measures such as new glazing may be necessary. Laminated glazing is preferable to double or triple glazing.

Design details of modifications so that they have a minimal visual impact on the historic appearance of a building and so they can be removed without damage to the historic material. These changes can have an enormous impact on window appearance; however, some methods do allow modification of some types of historic windows. For example, when glazing of an existing porch is contemplated as an energy-saving feature, the modification can be inserted in a plane behind the original structural members. Numerous good historic examples of porch enclosures exist at the Presidio.

Address energy conservation (the reduction of total heat gain or loss through windows) by changing to insulated glazing when new windows are required, adding exterior or interior shading devices or storm windows, or when appropriate, applying solar control film directly to window glass. Interior blinds, curtains, and other treatments can also be effective, and can be detailed in such a way that there is no damage to the original building. In all cases the appropriate treatment will depend on the type, location, and significance of the window.

Not Recommended

Furring of interior walls for insulation or to accommodate modern improvements which negatively impact the interior character-defining elements of a historic opening.

Although not a frequent alteration at the Presidio, some multi-paned windows have been replaced with fixed, single-pane windows. When replacement is necessary, either the original window should be duplicated or a reasonable facsimile should be used, with the approval of the National Park Service.

The insect screen on the right window above obscures the window muntins and eliminates the pattern of light and dark, flattening the facade's appearance. When needed, screens should be divided to match the windows, and recessed if possible.

The awnings on this simple building serve to limit heat gain. A similar solution may be appropriate for some Presidio buildings, but such action should only be considered after evaluating its historical appropriateness.

Entrances & Porches

Entrances and porches are quite often the focus of historic buildings, particularly on primary elevations. Together with their functional and decorative features such as doors, steps, balustrades, pilasters, and entablatures, they can be extremely important in defining the overall character of a building. In many cases, porches are energy-saving devices, shading southern and western elevations. Usually entrances and porches were integral components of a historic building's design; for example, porches on Greek Revival houses, with Doric or Ionic columns and pediments, echoed the architectural elements and features of the larger building. Central one-bay porches or arcaded porches are evident in Italianate style buildings of the 1860s. Doors of Renaissance Revival style buildings frequently supported entablatures or pediments. Porches were particularly prominent features of Eastlake and Stick style houses; porch posts, railings, and balusters were characterized by a massive and robust quality, with members turned on a lathe. Porches of bungalows of the early 20th century were characterized by tapered porch posts, exposed posts and beams, and low-pitched roofs with wide overhangs. Art Deco commercial buildings were entered through stylized glass and stainless steel doors.

Due to the restrained ornamental styles of Presidio buildings, porches become prominent elements and are nearly always primary character-defining features. They also physically reflect the Army's formality. Porches are prevalent throughout the Presidio. They provide building functions such as entries and outside rooms and help define the style of the buildings. They also function in the larger context of the site, visually unifying a group of buildings and orienting it to features such as the parade grounds. Front porches, some very formal, are present at primary entrances to most nonindustrial buildings. Many buildings also have side and rear porches, especially the single-family and duplex residential buildings. The barracks buildings tend to have very generous porches. Even industrial buildings have shed-roofed loading docks, and simpler service and delivery entrances; many also have large, sliding wooden doors. Almost all of the original doors and entrances at the Presidio are character-defining features.

The use of decorative detail is limited on most buildings at the Presidio, and while there are many porches, they are simple in both design and construction. Some porches are exterior to the building envelope, as in the early brick barracks, and others are recessed into the building envelope, such as the arcaded Mission Revival barracks at Fort Scott.

Entrances and Porches

The earliest buildings on the Presidio, in the Federal and Italianate styles (ca. 1860–1880) have raised basements with stairs leading to entrances and porches. Porch columns and pilasters are of the Classical orders—Doric, Ionic, Corinthian, Tuscan, and variations thereof. Greek Revival porches of the officers' quarters also have split columns (columns made of boards set apart by decorative wooden spacers and given simple molded caps and bases). Balusters in these early residential structures were turned, stick, or crossed-stick. The majority of Presidio buildings are a simplified version of the Colonial Revival style (ca. 1895–1920). Their front porches are generally one story with classically ordered columns and doors that have classical details in their architraves or heads.

In the Mission Revival style buildings (ca. 1890–1912) the porches are recessed arcades of one or two stories with round arch openings. The prominent doors are often set into round arch openings and some have wrought-iron balconies or details. The Colonial/Georgian Revival style (ca. 1912–1941) features prominent symmetrical front porches and balconies with geometric wood balustrades. The Mediterranean Revival buildings (ca. 1912–1941) often have simple stucco porches with red tile roofs.

Some of the porches at the Presidio have been altered. The functions of some porches have changed, for example, a formal entry porch which no longer serves as the primary entrance; others have been enclosed. Many porches were built to standard Army building designs that were modified at the Presidio to provide shelter from the wind and fog. These enclosures may have acquired significance and become character-defining features themselves. Some were constructed insensitively and consequently have not acquired significance.

As elements of sustainable design, porches function as energy-saving devices. While open porches block solar heat gain, enclosed porches allow solar heat gain, offer shelter against the cold wind, and reduce heat loss from the building interior. Functioning as transition spaces from the outside that help to keep the building clean, porches help protect interior finishes. Presidio porches, mostly built of wood, require regular but low-impact maintenance, primarily in the form of painting.

Courtesy Presidio Museum, GGNRA, NPS

Many porches have been partially or fully enclosed to shield against the weather or to gain floor area. These two photos of the same building illustrate how a building's historic character can be completely changed by such alterations.

Entrances and Porches

This building has many of the typical utilitarian features: shed roof, double swinging doors, and ramped loading dock fronting directly on the street.

The delicate detailing of the porch roof support posts is typical of the early residential buildings at the Presidio.

Recommended

Identify, Retain, and Preserve

Identify, retain, and preserve entrances—and their functional and decorative features such as doors, fanlights, sidelights, pilasters, entablatures, columns, balustrades, and stairs—that are important in defining the overall historic character of the building.

Identify the importance of alterations prior to considering changes. The Presidio has a significant number of enclosed porches; some are original and others are later additions. Alterations that have acquired significance should be maintained as currently configured.

Retain and preserve formal entrances even if they no longer provide primary pedestrian or vehicular access to the structure.

Protect and Maintain

Protect and maintain the masonry, wood, and architectural metal of entrances and porches through appropriate surface treatments such as cleaning, rust removal, limited paint removal, and reapplication of protective coating systems.

Not Recommended

Removing or radically changing entrances and porches which are important in defining the overall historic character of the building such that the character is diminished.

Stripping entrances and porches of historic material such as wood, cast iron, terra cotta tile, and brick.

Removing an entrance or porch because the building has been reoriented to accommodate a new use.

Cutting new entrances on a primary elevation.

Altering utilitarian or service entrances so they appear to be formal entrances by adding panelled doors, fanlights, and sidelights.

Failing to provide adequate protection to materials on a cyclical basis such that deterioration of entrances and porches results.

Recommended

Evaluate the overall condition of materials to determine whether more than protection and maintenance are required; that is, whether repairs to entrance and porch features will be necessary.

Identify porch maintenance problems caused by general wear or by inappropriate changes and find solutions which are compatible with the character-defining features. Porches at the Presidio, particularly wood porches, require a high degree of maintenance due to their frequent exposure to moisture and traffic. Maintain existing materials with protective systems appropriate to those materials.

Distinguish between historic materials and inappropriate past maintenance interventions. Past maintenance procedures at the Presidio have often been haphazard and insensitive to preservation practices, utilizing inappropriate materials. Remove inappropriate alterations and materials, such as awnings or porch floor coverings; in many cases they also contribute to increased deterioration.

Not Recommended

Failing to undertake adequate measures to ensure the protection of historic entrances and porches.

The enclosure of this residential porch was sensitively executed by adding glazing behind the original structural members, and has since become a significant contributing feature of the building.

Entrances and Porches

Mission Revival porches tend to be recessed into the building envelope. The strong play of light and shadow and the rhythm of arches are primary design features.

The warehouse buildings have large, rolling doors which are character-defining features and should be retained. They should continue to be used as service doors, or with a new occupancy, they might become nighttime "shutters" over large glazed openings.

Recommended

Repair

Repair entrances and porches by reinforcing the historic materials. Repair will also generally include the limited replacement in kind—or with compatible substitute material—of extensively deteriorated or missing parts of repeated features where there are surviving prototypes such as balustrades, cornices, entablatures, columns, sidelights, and stairs.

Repair deteriorated elements of porches, such as wood stairs, decking, joists, or roofing, rather than replacing the entire porch. In many cases, only a small part of an element need be replaced, such as a column base instead of an entire column.

Improve the structural capacity of a porch, where needed, by adding additional concealed supports and shoring existing members, rather than replacing entire structural systems.

Not Recommended

Replacing an entire entrance or porch when the repair of materials and limited replacement of parts are appropriate.

Using a substitute material for the replacement parts that does not have the appearance of the surviving parts of the entrance and porch or that is physically or chemically incompatible.

An inappropriate modern addition, such as this awning, should be removed. It obscures the highly ornate, terra-cotta door surround, an important character-defining feature of the building.

Recommended

Replace

Replace in kind an entire entrance or porch that is too deteriorated to repair—if the form and detailing are still evident—using the physical evidence as a model to reproduce the feature. If using the same kind of material is not technically or economically feasible, then compatible substitute materials may be considered.

Check the archival sources as well as available physical evidence before designing a replacement entrance or porch. Many resources exist for Presidio buildings, including historic photographs and original drawings.

Give careful consideration to hardware, security equipment, signage, and lighting, so as not to detract from the character-defining features.

Design for Missing Historic Features

Design and construct a new entrance or porch when the historic entrance or porch is completely missing. The new feature may be a restoration based on historical, pictorial, and physical documentation; or a new design that is compatible with the historic character of the building.

Use the many resources available to guide the design of missing features. Archival sources include stock Army plans which may allow informed design decisions. In addition, many buildings retain physical evidence of missing details.

Not Recommended

Removing an entrance or porch that is beyond repair and not replacing it; or replacing it with a new entrance or porch that does not have the same appearance.

Changing the doors, door openings, surrounds, hardware, or other character-defining elements; or changing the location of the doors.

Creating a false historical appearance because the replaced entrance or porch is based on insufficient historical, pictorial, and physical documentation.

Introducing a new entrance or porch that is incompatible in size, scale, material, or color.

The loading docks at the wood warehouses shown above function as elevated walkways. The placement of the plant, vending machine, and air conditioning unit intrudes on the walkway and diminishes the building group's character. The photo below illustrates the negative impact of new overhead metal doors on a historic building.

Entrances and Porches

Due to easier vehicular access to the rear of this building, its grand front porch no longer serves as the primary entrance. It is important to restore and maintain the front porch and entrance and to consider ways to reestablish its use.

The second-floor arcade has been partially enclosed with new infill set back from the wall, helping maintain the original solid and void pattern of the facade. However, the type and size of windows is inappropriate.

Recommended

Alterations/Additions for the New Use

Design enclosures for historic porches only when required by the new use in a manner that preserves the historic character of the building. This can include using large sheets of glass and recessing the enclosure wall behind existing scrollwork, posts, and balustrades.

Design and install additional entrances or porches only when required for a new use in a manner that preserves the historic character of the buildings, i.e., limiting such alteration to non–character-defining elevations.

Check for original detailing. Many porches have been enclosed in ways that obscure original detail, but these elements are often still in place. Revealing them will help give a sense of the original design.

Not Recommended

Enclosing porches in a manner that results in a diminution or loss of historic character; for example, using solid materials such as wood, stucco, or masonry.

Installing secondary service entrances and porches that are incompatible in size and scale with the historic building, or that obscure, damage, or destroy character-defining features.

Introducing new elements to utilitarian buildings that disregard the significance of their loading docks, garage doors, or other character-defining features.

Adding multiple stairs to porches which originally had only one stair, even if the current function may benefit from multiple stairs; cutting additional stairs into a grand porch which will diminish the scale and formality of the porch.

Changing the doors and entry details or changing the location of character-defining doors and entries.

Recommended

Take particular care with additions to utilitarian buildings, where contemporary elements may be confused with the simple historic elements.

Retain the ceremonial functions of an original primary entrance, even when traffic patterns have shifted. In the past, the rear entrance frequently became the primary entrance, usually as a result of a change in the vehicular access to a building. Some of these modifications have been done sensitively; others have diminished the building's historic character. In the future, the rear entrance should remain visually secondary to the original front entrance. When it is necessary to replace the primary entrance with an entrance on another facade, consider linking the original front entrance with the proposed primary entrance by an interior space.

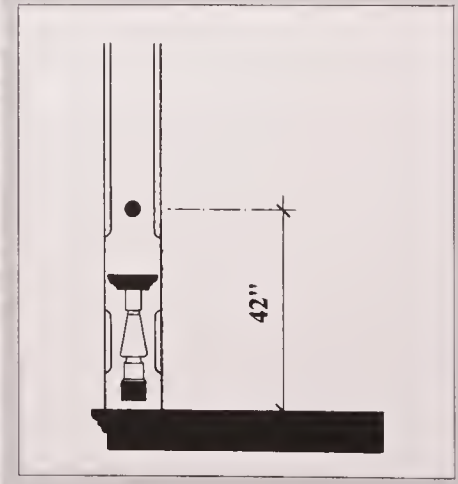
Use the State Historic Building Code to evaluate the actual hazards or deficiencies of porches and stairways that do not meet current code requirements for guardrails, handrails, and stair details. Develop interventions or alterations only as required for public safety. Alterations should be nondestructive to the historic materials. This could be accomplished by adding additional elements where necessary, while retaining original elements. Where new elements are added, they should be compatible with the existing fabric and differentiated from original elements.

Design disabled access to the buildings in a manner which is sensitive to the porches and entrance features. Most Presidio buildings will require improved accessibility, both to the buildings and through portions of the interior. (See the Accessibility Considerations chapter for more information.)

Not Recommended

In the building above, the entrance on the left has been extensively and insensitively remodeled. The size, scale, materials, color, and details are all inappropriate. The entrance on the right is a replacement modelled on the original drawings, but has had intrusive elements added. Care should be taken when selecting hardware, signage, lighting, and security equipment.

The incompatible new entrance, above, designed for auto access, does not respect the style or character of the original building. Its scale and materials are also inappropriate.



The upper-level porch on the building at left was enclosed by constructing a glazed wall behind the original posts and balustrade. The lower-level porch balustrade is too low and requires modification for safety; this must be done while maintaining the character-defining elements. A possible solution is shown in the sketch above.

New Additions

An attached exterior addition to a historic building expands its "outer limits" to create a new profile. Because such expansion has the capability to radically change the historic appearance, an exterior addition should be considered only after it has been determined that a new use cannot be met successfully by altering non–character-defining *interior* spaces. If a new use cannot be met in this way, then an attached exterior addition is usually an acceptable alternative. New additions should be designed and constructed so that the character-defining features of the historic building are not radically changed, obscured, damaged, or destroyed in the process of rehabilitation. New design should always be clearly differentiated so that the addition does not appear to be part of the historic resource.

Additions to existing Presidio buildings should be considered as a last resort, after all other alternatives have proved inadequate. The large amount of existing square footage at the Presidio will make it difficult to justify constructing more space. New additions can, however, serve the goals of preservation, if they reduce impact on significant original features.

Alterations at the Presidio have generally involved enclosing existing porches and balconies rather than adding on to the buildings. Original massing and architectural styles have thus usually been preserved, although significant features may have become obscured by new finishes. Each style, whether historic or contemporary, has its own design vocabulary, and successfully designed additions will reflect the inherent differences of individual styles. In some cases the additions could be contrasted with the original buildings in a manner that is compatible with their significant features.

Designing a new addition to an existing building at the Presidio poses a challenging design problem for both historic and nonhistoric buildings. An addition should be compatible with the existing structure and appropriate for its particular area within the Presidio; at the same time, character-defining features must be preserved and the new addition must be differentiated from the existing structure. Despite their varied architectural styles, Presidio buildings have an established relationship, which will make it particularly difficult to design an appropriate addition. Although a new addition may be made more compatible to the existing building by being subordinated architecturally, constructed of the same materials, or designed to emphasize the original massing and to repeat fenestration patterns, it can still easily disrupt the original cohesiveness. The design of new additions must be coordinated with the National Park Service, following the same review and approval process as for other modifications.

New Additions

In response to the siting and context of the Presidio, new additions must be visually unobtrusive and also protect original facades, particularly of historic structures. Circulation patterns at the Presidio have often changed over time, so that the primary facade of a building may no longer be the most visible. Consequently, the effect of additions to the rear elevation must be carefully evaluated, as an originally secondary elevation may have become the most visible. A new addition should be located away from both the original primary facade and the current most visible facade.

Sustainable design principles imply utilizing existing space before constructing additional space. If a new addition is permitted, sustainable design should govern its construction. In all cases, an addition must be designed to be reversible, with minimum impact on historic fabric, particularly where the new structure comes into contact with the historic. As much as possible, renewable and recyclable construction materials should be used for the addition. Natural, locally produced, and high-quality materials will improve sustainability. The addition should be designed for energy efficiency with highly efficient equipment, and should maximize passive energy design. Life-cycle costs should be carefully weighed against construction costs; it is important to recognize that long-term savings in operating costs may justify higher initial costs for some items. Sustainability will require analyzing the impact of the addition on the existing building, as well as on ventilation, weather protection, fire protection, and access to adjacent buildings.

New Additions

Is An Addition Really Needed?	What Impact Will An Addition Have?	Considerations for Designing an Addition
• Is the proposed use compatible with the scale, type of construction, and original occupancy of the building? • Can all rooms and functions required by the proposed use be accommodated in the building without major impact to historic building fabric or significant spaces? • Can disabled access, egress, toilets, and code requirements or special environmental controls for the proposed use be provided without major impact to historic building fabric or significant spaces? • Can adjustments be made to the proposed use to reduce or eliminate major impacts to historic building fabric or significant spaces?	• Can an addition be designed to fit in with the site and site circulation without a major impact to sensitive landscape or architectural features? • Can the addition and its physical effect on the original building be minimized and made reversible? • Can the addition be placed away from the original and current primary facades so that it is not readily perceived? • Can the perceived size of the addition, from any vantage point, be kept smaller than the existing building? • How will an addition affect the natural light, ventilation, and energy efficiency of a building?	• What is the building type? — Residential — Commercial — Industrial — Utilitarian — Institutional • What primary building materials are used? — Wood — Concrete — Stucco — Brick — Stone — Steel • What is the building form and massing? — Gabled, hipped, or flat roofs — Flat wall surfaces or projecting eaves, awnings, or balconies — Simple volumes or complex arrangements of forms — Building height and number of stories • What is the building style? — Mission Revival — Colonial Revival — Utilitarian — Other • What are the architectural characteristics? — Symmetrical vs. asymmetrical — Formal refined detailing vs. simple, plain construction — Rhythm of doors, windows or structural elements vs. irregular spacing — Color and scale of building • What are the adjacent sites and buildings like? — Similar or identical buildings — Individual buildings with distinctive characteristics — Regularly spaced structures clustered on a site — Orientation within cluster — Part of a streetscape — Isolated buildings in the landscape — Level or sloping site • Where should the addition be placed to reduce its visual impact? — Least visible elevation — Rear elevation — Side elevation — Effect on existing views • How should the addition be attached to the building? — "Hyphen" or connecting link — Direct abutment — Detached

New Additions

Recommended

Place functions and services required for the new use in non-character-defining interior spaces rather than installing a new addition.

Evaluate whether the proposed use of a building is appropriate. Consider an alternative use if it requires a new exterior addition, or alter the building program to better meet the existing configuration of the building.

Recognize that a decision might be aesthetically pleasing in the design of an independent new building but may not be appropriate at the Presidio as regards historic preservation, because it may overwhelm or compromise the historic character of the buildings and site.

Consider an attached exterior addition in terms of both the new use and the appearance of other buildings in the historic district or neighborhood.

Not Recommended

Expanding the size of the historic building by constructing a new addition, when the new use could be met by altering non-character-defining interior space.

Designing and constructing new additions that result in the diminution or loss of the historic character of the resource, including its design, materials, workmanship, location, or setting.

Constructing "temporary" additions for permanent functions, as opposed to carefully planned and designed additions that have a potential to become part of the history of a building and contribute to its complexity.

Demolishing any part of an existing building, including an existing addition, to make way for a new addition without first ascertaining whether the part is significant and whether there are feasible use alternatives.

Additions to this firehouse were built onto the original structure without regard for the original style or materials, obscuring significant detailing (the additions themselves have exteriors of different materials). Their placement in relation to the existing building appears unplanned as well.

New Additions

Early garages and utility structures at the Presidio were designed to be compatible with the buildings they serviced. Roofs were of like materials and normally followed the same lines. Shown below is a carport whose shape and materials do not relate to the context. In its relatively prominent location, it is an example of an entirely inappropriate design.

Recommended

Take into account the context of the Presidio as a whole. Design additions that are compatible with that larger context, but that also respond to the immediate surroundings and the building group. Locate necessary attached or detached additions in less sensitive zones of the cultural landscape, in inconspicuous areas of the site. An addition in the back of a particular building may still be perceived in the setting—due to the topography at the Presidio, where there are many vantage points.

Integrate a new addition into the building and the site as a whole. Preserve the natural features of the site. Pay particular attention to changed drainage patterns, the existing trees, and grading. Address the change of circulation routes to and around the building. Maintain the original sense of arrival and entry.

Identify whether a building is part of a cluster of similar repetitive building types. Consider how a new addition will affect the whole building group. Maintain uniformity that characterizes the group.

New Additions

Recommended

Identify a building's character-defining and significant features. Examine the stylistic complexity of the building to make informed decisions about changes. Most Presidio buildings have simple detailing and massing. Design of an even more restrained addition requires special consideration and calls for a creative solution so as not to obscure the already understated character-defining features of the original.

Design new additions in a manner that makes clear what is historic and what is new. Allow the historic building to predominate.

Use successful precedents as models for new designs. Many Presidio buildings consist of a large main block and several smaller wings. The design relationship between these original elements may serve as an example in visualizing additions.

Reflect the original massing and scale of the existing building. Simple, rectangular additions will fit in better with simple cubic buildings. Additions to Victorian or Mission Revival style buildings may best be designed using more complex forms. Flat, gabled, or hipped roofs on original buildings can provide a precedent for roof lines of the addition.

Not Recommended

Imitating a historic style or period of architecture in new additions, especially for contemporary uses such as drive-in banks or garages.

Recreating a historic building addition based on insufficient information.

Altering the character and the perception of the original building by placing an addition where it is highly visible, e.g., in front of the building, on a character-defining primary elevation, or in a place where it will be visible from a prominent location.

The relationship between small wood and brick wings and larger structures, as shown above, can be used as an example for the design of new additions. Materials, massing, and forms are all used to subordinate the wings to the main building.

New Additions

These two views of the same building show an addition inappropriate in scale, fenestration and connection to the existing building. Note also how the change in grade can affect the appearance of the new addition, especially if it is handled as an afterthought.

Recommended

Achieve a balance between imitation and contrast. The degree of similarity to the original will be different in each case; some buildings will allow for more abstraction and variation.

Distinguish between new and existing elements; this may be accomplished through the use of contrasting materials appropriate for the original period of construction and the scale of the structure. A small wood-sided addition to a moderately sized brick building provides contrasting color and form.

Not Recommended

Using the same wall plane, roof line, cornice height, materials, siding lap, or window type to make additions appear to be a part of the historic building.

Imitating exactly woodwork, brick joints, architectural detailing, and the building form. A new addition should be discernible as new and should not be an exact imitation of an original structure.

Contrasting in a manner that overpowers the architectural features of an existing building.

Contrasting materials inappropriately, such as a brick addition on a wood-sided structure. Brick is usually considered a more substantial and refined construction material than wood, and it is historically rare to find examples of brick additions to wood structures.

New Additions

Recommended

Construct a new addition to minimize the loss of historic materials and so that character-defining features are not obscured, damaged, or destroyed. Design an addition so that the impact on significant features is minimized. Where the existing building joins the new addition, preserve existing exterior details, even though they will occur on the new interior. Limit the size and number of new openings between old and new to minimize the destruction of historic fabric. Any effect of the new structure on the existing should be reversible. If an addition is removed in the future, the essential form and integrity of the original structure should remain unimpaired.

Locate an attached exterior addition at the rear or on an inconspicuous side of a historic building, and limit its size and scale in relation to the historic building.

Place new additions such as balconies and greenhouses on non–character-defining elevations and limit size and scale in relation to the historic building.

Design appropriate energy-saving additions such as greenhouses, shutters, and awnings. Research the historical appropriateness of such additions to a particular building or location. Position less appropriate additions in concealed locations.

When additional stories are required for the new use, design them to be set back from the wall plane and to be as inconspicuous as possible when viewed from the street.

Not Recommended

Attaching a new addition so that the character-defining features of the historic building are obscured, damaged, or destroyed.

Designing a new addition so that its size and scale in relation to the historic building are out of proportion, thus diminishing the historic character.

Designing new additions such as multistory greenhouse additions that obscure, damage or destroy character-defining features of the historic building.

This addition, although brick like the original building, has not maintained the rhythm and proportions of the original facade. The fenestration design is especially insensitive. The massive addition on the inside corner overwhelms the original structure and inhibits the perception of the original massing.

Small mechanical enclosures designed as detached additions similar to existing garages may provide the best location for new mechanical equipment if louvers are used instead of overhead doors.

New Additions

Presidio Photo Facility Files
Presidio Museum, GGNRA, NPS

Shown above, the design of the original chapel is contrasted with the present configuration. This is an example of an especially sensitive building form, and the addition has compromised the traditional massing and character of the chapel's interior and exterior. Interestingly, the materials and window treatment exhibit an attempt at good design that might have been appropriate in an addition to another building type.

Recommended

Consider setbacks and reveals in the wall or roof plane to differentiate the new from the existing. The setback could become a connector that could help minimize the impact to the existing structure.

Use materials compatible with the existing structure.

Provide compatibility in plan as well as in elevation. Pay attention to interior features at transitions from old to new, such as floor level changes and variations in ceiling height.

Relate to existing character-defining lines or elements established by the original building, such as window sizes, cornice lines or belt courses, to provide continuity with a new addition. For example, if wide moldings are used on the original building, consider using a similar design.

Allude to the rhythm of existing fenestration; use similar sizes, massing, and scale of details.

Not Recommended

Constructing additional stories so that the historic appearance of the building is radically changed, or adding stories on the Presidio buildings. In most areas of the Presidio, any change in roofscape will have a major impact on the landscape due to the hilly terrain, and should not be considered. Even penthouses and other minor rooftop additions require particular attention.

Duplicating the exact form, material, style, and detailing of the historic building in the new addition so that the new work appears to be part of the historic building.

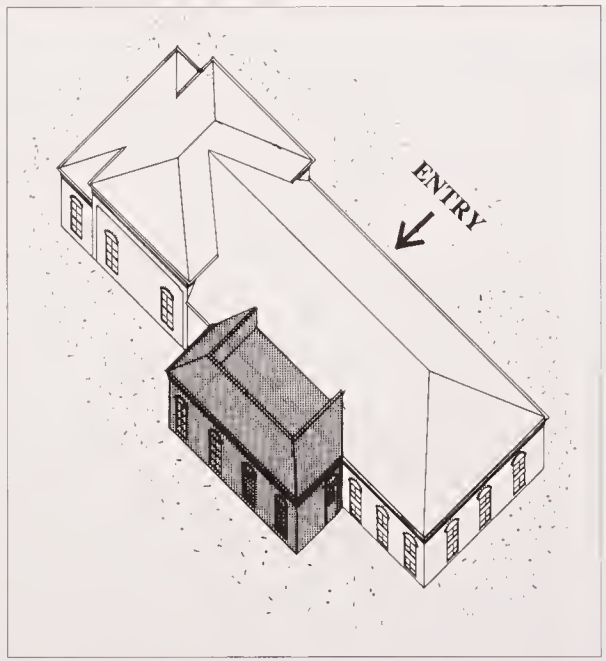
Attaching historical detail to an otherwise modern addition in an attempt to "historicize" it. The ornament should be an integral part of the building design, as opposed to an appliqué.

Recommended

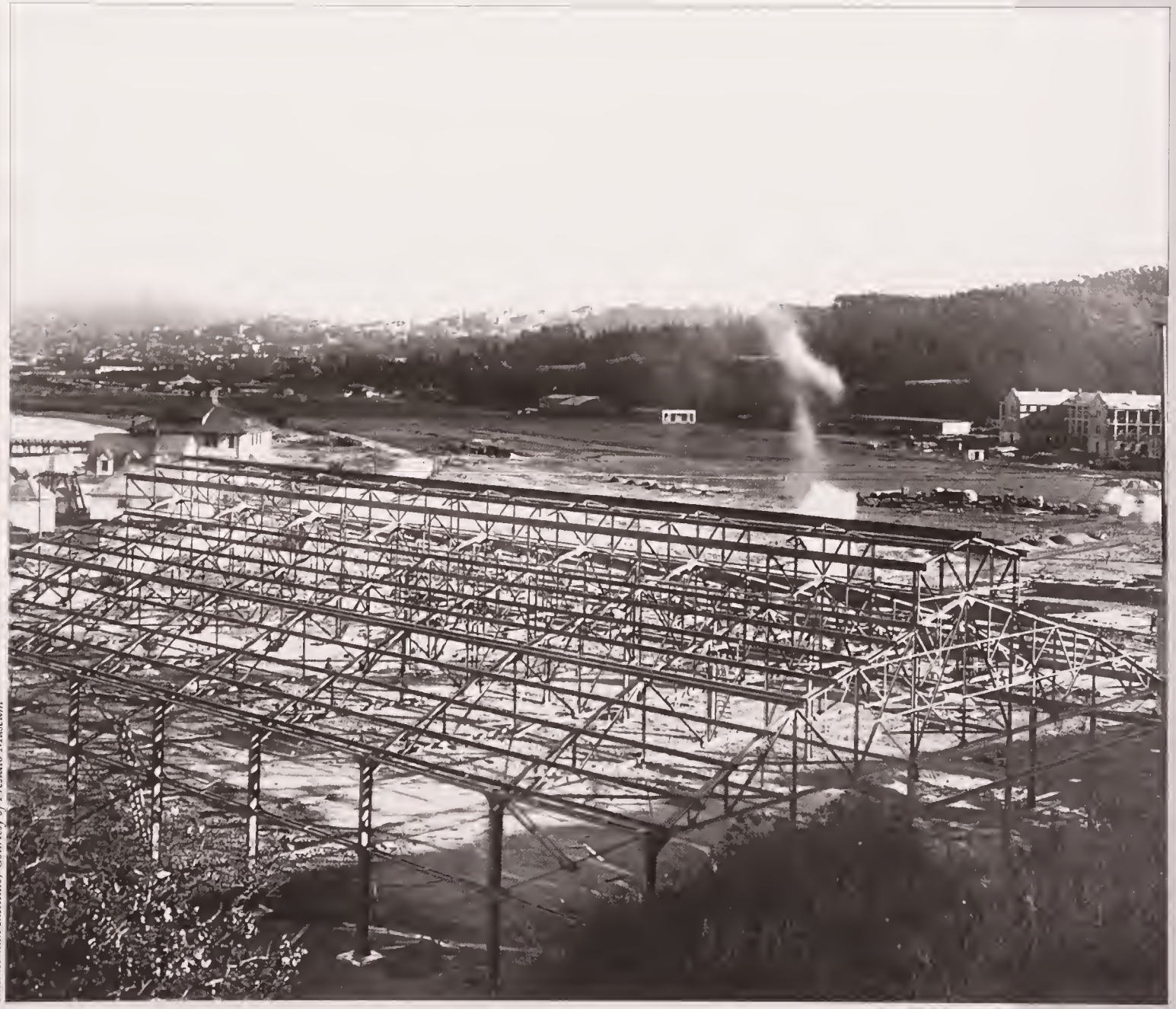
Consider replacement of an existing, structurally inferior addition or a nonhistoric addition which is clearly inappropriate to the historic character of the building. Often such additions no longer satisfy the functional needs for which they were initially designed and their careful demolition may reveal intact significant features of the original building.

Examine structural and construction issues. If the addition is adjacent to a historic building consider the need for expansion joints and study the physical and chemical compatibility of materials. Judge whether the new addition should be tied into the existing structure or whether it should be a separate assembly. Anticipate potential differential movement during earthquakes.

Limit any new excavation or regrading adjacent to historical foundations to avoid undermining the structural stability of the building and potential archeological resources. Provide for archeological monitoring during construction as deemed appropriate by the National Park Service.



The shaded area in the sketch above shows an addition designed for the least visible building elevation (the rear elevation in this case). The addition reflects the original building scale, eave heights, spacing of fenestration, size of windows and doors, hipped roof, and the brick detailing. The addition is subordinate to the original building but compatible with the original design.



Smithsonian Institute, Courtesy of Presidio Museum

Structural Systems

The structural system of a building should always be examined and evaluated early in the project planning stage to determine both its physical condition and its importance to the building's historic character or historical significance. Exposed features of the structural system, such as load-bearing brick walls, cast iron columns, roof trusses, posts and beams, vigas, and stone foundation walls, may be important in defining the building's overall historic character. Unexposed structural features that are not character-defining or an entire structural system may nonetheless be significant in the history of building technology.

The types of structural systems found in the United States include, but certainly are not limited to, the following: wooden frame construction (17th century), balloon frame construction (19th century), load-bearing masonry construction (18th century), brick cavity wall construction (19th century), heavy timber post and beam industrial construction (19th century), fireproof iron construction (19th century), heavy masonry and steel construction (19th century), skeletal steel construction (19th century), and concrete slab and post construction (20th century).

The Presidio contains a wide range of structural systems and materials, representing two hundred years of construction technology. The structural systems of buildings at the Presidio vary both with the type of building use and the era when the building was constructed. Overall, the Presidio presents examples of most of the common structural materials and systems of the 19th and 20th centuries, including:

adobe: ca. 1780
unreinforced brick or stone: 1870–1900
cast iron (columns): late 1800s
wood frame: 1860–present
unreinforced concrete: late 1800s–1906
reinforced concrete: 1890–present
steel frame: ca. 1900–present

In the 19th and into the early 20th century, the U.S. Army was a leader in the development and utilization of new construction systems and technologies. During this period, the Army had a reputation for high-quality engineering design and construction. Buildings constructed at the Presidio during this period are consistent with that reputation. With very few exceptions, even utilitarian structures were well conceived and constructed, using materials appropriate to their intended use. A survey of Presidio structures shows that despite changes in use, haphazard remodeling, and some lapses in maintenance, the historic structures have remarkably few general structural problems, such as foundation movement, weak floors, or sagging roofs. Based on their performance to date, gravity load–resisting elements of the original structural systems in early Presidio structures in many cases will be found to be quite sound and appropriate for continued use with only minor work. Some typical problems are: the loss of the structural integrity of reinforced concrete due to concrete deterioration or corroded reinforcing bars, cracks due to settlement and previous failures, decay of wood elements such as posts on grade, and possibly inadequate floor load capacity.

Seismic Hazard Issues at the Presidio

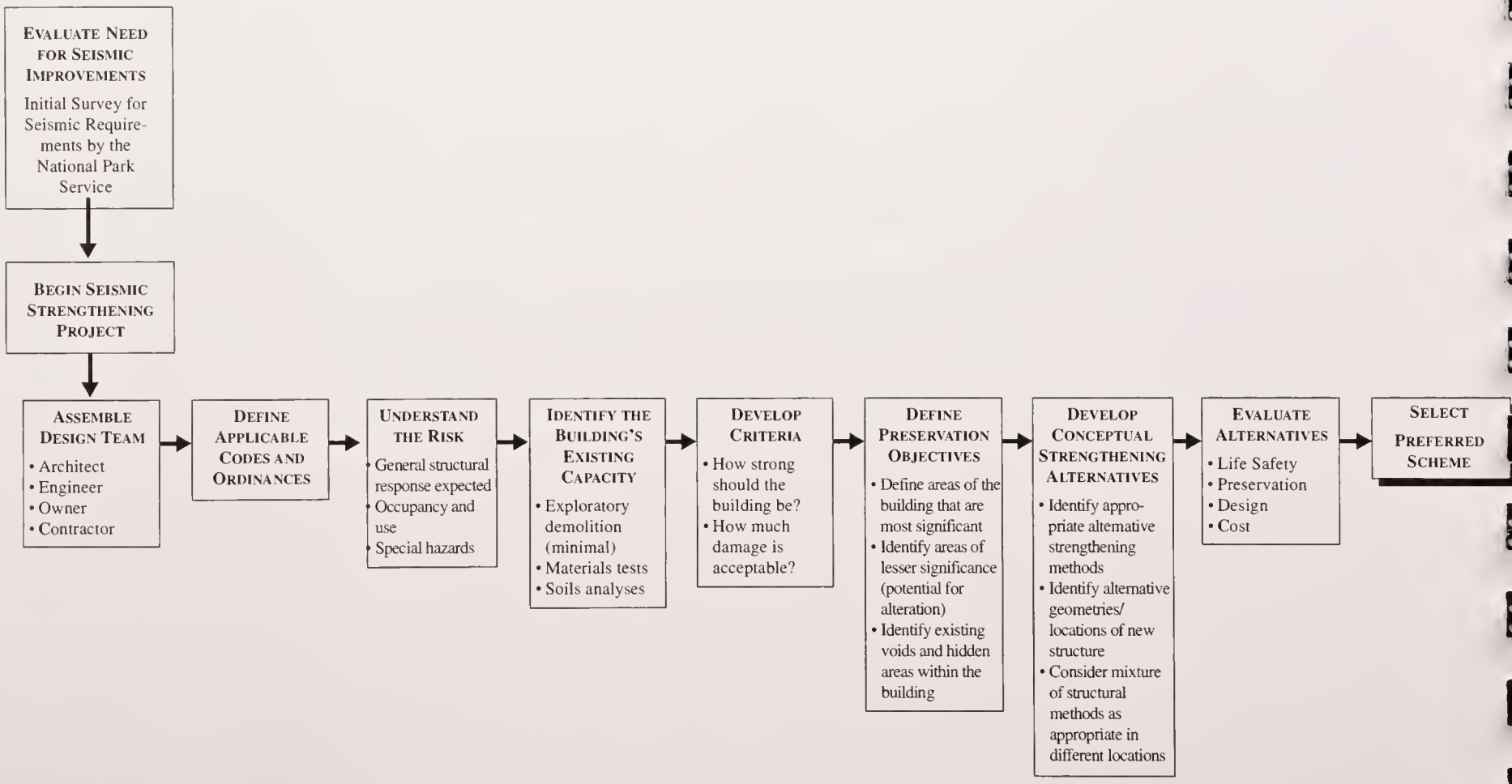
Although buildings constructed at the Presidio over the last 200 years were built to the best standards of their time, Army construction systems and standardized building types were based on national design models. They were often modified in significant ways to accommodate local conditions, but little was known about earthquake-resistive design. Army engineers were early advocates of embedding bond iron in masonry buildings as a means to improve seismic resistance, but very few special measures were taken to improve the overall seismic resistance of buildings at the Presidio. Today, knowledge and understanding about earthquake-resistant structural design continue to grow and change as engineers are able to test and monitor performance in actual earthquakes. Code requirements for both new structures and for retrofit design have changed and will undoubtedly continue to change over time. For the most part, it is buildings on filled soil sites that have suffered significant damage.

Requirements for measures to strengthen historic buildings at the Presidio to reduce seismic hazards will depend on a number of factors specific to each building. The evaluation of the need for seismic strengthening and the performance objective required will be made by the National Park Service for each building and tenant situation.

Once the decision is made to make seismic improvements to a building, an appropriate design response must be developed. The many different building systems, as well as the variety of proposed uses for the structures, require a wide range of structural interventions for rehabilitation. Seismic strengthening measures appropriate for one situation may be completely inappropriate in another. Although solutions will vary, the methodology for evaluating and implementing solutions should be similar in each situation. A consistent design process is essential to the development of appropriate solutions and to obtaining approval from the review agencies, including the National Park Service and the State Office of Historic Preservation. The following chart indicates the recommended design process for evaluating and implementing seismic improvements in a historic building. Structural strengthening and seismic hazard reduction measures are inherently consistent with the policy of sustainable design, working to limit hazards to life safety while also assuring the building's future life.

Historic buildings frequently have rafter ties, bond iron ties or other elements which improve their seismic capacity. A building should be carefully researched and surveyed to locate these elements, and the seismic analysis should take their value into account.

Bolting of floor and roof diaphragms to masonry walls is an essential element of a seismic hazard reduction program. Care in location of bolt plates is important to prevent a haphazard appearance. In visually sensitive facade areas, grouted bolts should be used instead of through-bolts, to eliminate the need for surface plates.


EVALUATE NEED FOR SEISMIC IMPROVEMENTS
Initial Survey for Seismic Requirements by the National Park Service
BEGIN SEISMIC STRENGTHENING PROJECT
ASSEMBLE DESIGN TEAM
• Architect
• Engineer
• Owner
• Contractor
DEFINE APPLICABLE CODES AND ORDINANCES
UNDERSTAND THE RISK
• General structural response expected
• Occupancy and use
• Special hazards
IDENTIFY THE BUILDING'S EXISTING CAPACITY
• Exploratory demolition (minimal)
• Materials tests
• Soils analyses
DEVELOP CRITERIA
• How strong should the building be?
• How much damage is acceptable?
DEFINE PRESERVATION OBJECTIVES
• Define areas of the building that are most significant
• Identify areas of lesser significance (potential for alteration)
• Identify existing voids and hidden areas within the building
DEVELOP CONCEPTUAL STRENGTHENING ALTERNATIVES
• Identify appropriate altemative strengthening methods
• Identify alternative geometries/ locations of new structure
• Consider mixture of structural methods as appropriate in different locations
EVALUATE ALTERNATIVES
• Life Safety
• Preservation
• Design
• Cost
SELECT PREFERRED SCHEME

Recommended

Identify, Retain, and Preserve

Identify, retain, and preserve structural systems—and individual features of systems—that are important in defining the overall historic character of building, such as post and beam systems, trusses, summer beams, vigas, cast iron columns, above-grade stone foundation walls, or load-bearing brick or stone walls.

Prior to designing any seismic interventions:

- Conduct an existing conditions survey to understand existing components of the building system. Exploratory demolition should be done only when there is no other means to obtain necessary information. As much as possible it should occur in non-character-defining locations with low visibility. Repairs should be performed by an appropriate tradesperson.

- Conduct an adequately detailed testing program to evaluate and understand the physical capacities of the existing materials. The program should incorporate masonry push tests, concrete core samples, pachometer tests, or other appropriate tests.

- Evaluate or develop geotechnical information specific to the building site.

Establish the construction history of the building. Alterations may have compromised original structural systems; earlier strengthening campaigns may have added capacity.

In evaluating the structure, assemble a complete design team. This should include, in addition to a qualified engineer, an architect and a contractor who are experienced with historic structures.

Not Recommended

Removing, covering, or radically changing features of structural systems that are important in defining the overall historic character of the building such that the character is diminished.

Putting a new use into the building that could overload the existing structural system; or installing equipment or mechanical systems that could damage the structure.

Demolishing a load-bearing masonry wall that could be augmented and retained, and replacing it with a new wall (i.e., brick or stone), using the historic masonry only as an exterior veneer.

Leaving untreated known structural problems such as deflection of beams, cracking and bowing of walls, or racking of structural members.

Using treatments or products that accelerate the deterioration of structural material such as introducing urea-formaldehyde foam insulation into frame walls.

Making structural assumptions or discounting the building's capacity without a complete understanding of the existing structural system.

Projecting chimneys are the most prevalent seismic hazard at the Presidio. The Army braced many chimneys. This brace provides a good example for others, with a fairly unobtrusive strut to the roof in the weak (short) direction of the chimney connected to a steel collar at the top of the chimney. Bracing chimneys in place is preferred over constructing new reinforced chimneys to match, or removing chimneys without replacement.

Structural Systems

Shown above is a typical wood-frame structure in Ferndale, California, after the 1992 Cape Mendocino earthquake. Because the post and beam structure under the house failed completely, the walls and roof superstructure dropped to the ground. Investigation and strengthening of the existing substructure bracing is important for Presidio wood-frame structures.

Wood-frame residential structures, although generally not considered seismic hazards, frequently have very limited lateral support between the first floor and the foundation, often resulting in failure in even moderate earthquakes. Strengthening braces can be added very economically, but should be detailed in such a way that the exterior siding and trim retain their appearance.

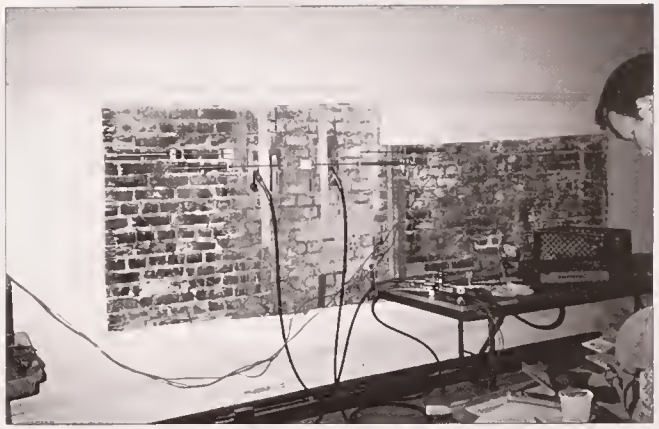
Recommended

Define applicable codes as established by the National Park Service.

Identify existing capacity of the structural system, levels of hazard, and type and extent of damage expected. Include analysis of elements such as chimneys, cornices, and parapets, as well as the overall building.

Define applicable performance objectives. How strong does the building need to be in order to protect the life safety of its occupants? How much damage is acceptable? Should the building be repairable after a major earthquake (or just still standing)? These questions should be posed in each instance, and the response may be quite different for different structures and different uses.

Establish preservation objectives. Define the most significant areas of the building interior, and less significant areas that may be available for alteration. Attempt to limit interventions to areas of lesser significance. The architect should assume a key role in assisting the engineer in the development of alternatives. Coordinate this process with other rehabilitation/preservation objectives for the building, which may include improved egress, accessibility, heating, ventilation, and air-conditioning, or other planned programming alterations.



A careful program of in-place testing is essential to the process of evaluating the building's seismic capacity. Illustrated is a masonry push-test involving two hydraulic jacks to estimate the shear capacity of the wall. Locations of tests should be chosen carefully so that the character-defining historic fabric is preserved to the greatest extent possible. Replacement of damaged brick should be performed by a mason skilled in matching the appearance and strength of the wall, rather than by the test technician.

Recommended

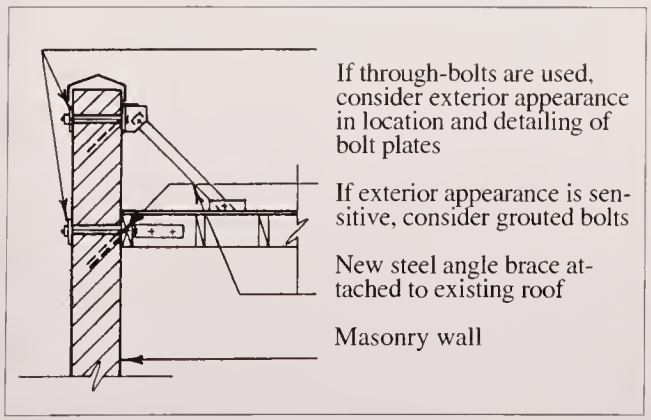
Protect and Maintain

Protect and maintain the structural system by cleaning the roof gutters and downspouts; replacing roof flashing; keeping masonry, wood, and architectural metals in a sound condition; and assuring that structural members are free from insect infestation.

Examine and evaluate the physical condition of the structural system and its individual features using nondestructive techniques such as X-ray photography.

Repair

Repair the structural system by augmenting or upgrading individual parts or features. For example, weakened structural members such as floor framing can be paired with a new member, braced, or otherwise supplemented and reinforced.



Parapet brace detail.

Not Recommended

Failing to provide proper building maintenance, such that the structural system deteriorates. Causes of deterioration include subsurface ground movement, vegetation growing too close to foundation walls, improper grading, fungal rot, and poor interior ventilation that results in condensation.

Utilizing destructive probing techniques that will damage or destroy structural material.

Structurally upgrading a building in a manner that damages interior features or spaces, or that diminishes the historic character of the exterior—for example, installing strapping channels or removing a decorative cornice.

Replacing a structural member or other feature of the structural system that could be augmented and retained.

Ignoring the inherent capacity of the existing structural system, and installing an entirely new structural system in the building shell.

Unreinforced masonry parapets present seismic hazards independent of the basic building structure. Strengthening measures should be concealed behind the parapet or within the wall.

Structural Systems

Internal grouting of rubble masonry walls can greatly improve their seismic capacity without changing the appearance of or demolishing interior historic fabric. Care in developing a grout mix which does not damage the wall is an important element of this alternative procedure.

Core drilling of masonry walls is a method for increasing the tensile capacity of a masonry wall without visual impact on either the exterior or the interior surfaces of the wall. It involves drilling 4 inch-diameter vertical cores in the masonry wall, then installing grout and rebar. It may be appropriate in areas of significant interior historic fabric. As a strengthening method, core drilling is still relatively new. It is not a reversible system and should only be used with great care and with the approval of the National Park Service.

Recommended

Develop alternative conceptual schemes for seismic strengthening alterations. The schemes should consider both alternative structural methods and different potential areas for locating reinforcing elements.

Evaluate the alternative conceptual schemes for their relative impact on or loss of historic material, impact on other building systems, and for their relative cost. They should also be evaluated with respect to other building needs, such as egress.

Consider structural schemes which are appropriate to their building type. For example, exposed braces may be very appropriate in an industrial building. If structural strengthening is required in a more finished interior space, furring out walls to conceal the brace may be appropriate. Materials and details should also be developed to be physically compatible with the surrounding original materials.

In cases where exterior and interior significance are both great and conventional methods will result in extensive loss of historic material, consider options for "blind" strengthening, such as masonry core drilling.

In highly sensitive areas of a facade, where anchorage of walls to floors and roof is necessary, consider epoxy-grouted concealed anchors.

Where exposed bolt plates are necessary, carefully consider their location and placement on the building and potential architectural treatment, such as paint, detail, or the possibility of recessing them below stucco or other existing material.

Recommended

Where possible, seismic strengthening measures should be designed to be reversible. This is frequently impossible due to the nature of the work, but it should be considered as a goal. Alternative schemes should be evaluated for their relative reversibility.

Replace

Replace in kind—or with substitute material—those portions or features of the structural system that are either extensively deteriorated or are missing when there are surviving prototypes such as cast iron columns, roof rafters or trusses, or sections of load-bearing walls. Substitute material should have the same form, design, and overall appearance as the historic feature; and at a minimum, should have equal load-bearing capabilities.

Not Recommended

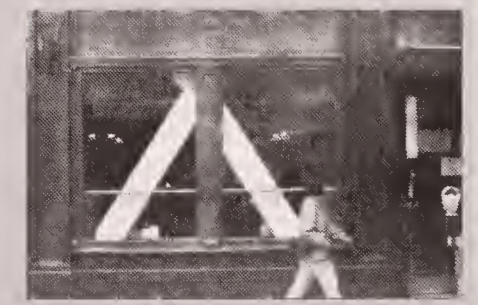
Installing a replacement feature that does not have the same appearance, e.g., replacing an exposed wood summer beam with a steel beam.

Using substitute material that does not equal the load-bearing capabilities of the historic material and design or is otherwise physically or chemically incompatible.

Structural interventions, if carefully designed and coordinated with the architect, can frequently occur adjacent to historic fabric without necessitating total removal or demolition. Shown is a concrete shear wall which has been installed behind an existing hand-painted plaster ceiling and corbel beam.

Structural Systems

Interiors of industrial structures are very appropriate settings for exposed bracing or tie-rods and connections. Consider subtle methods to distinguish new structural materials from the original ones.



Steel braced frames should be located carefully, so that they do not obscure windows or change the exterior appearance of the building.

Recommended

Alterations/Additions for the New Use

Limit any new excavations adjacent to historic foundations to avoid undermining the structural stability of the building or adjacent historic buildings. Studies should be done to evaluate potential damage to archeological resources.

Correct structural deficiencies in preparation for the new use in a manner that preserves the structural system and individual character-defining features.

Design and install new mechanical or electrical systems when required for the new use that minimize the number of cuts or holes in structural members.

Add a new floor when required for the new use if such an alteration does not damage or destroy the structural system or obscure, damage, or destroy character-defining spaces, features, or finishes.

Create an atrium or a light well to provide natural light when required for the new use in a manner that preserves the structural system as well as character-defining interior spaces, features, and finishes.

Not Recommended

Carrying out excavations or regrading adjacent to or within a historic building that could cause the historic foundation to settle, shift, or fail, similarly affect adjacent historic buildings, or destroy significant archeological resources.

Radically changing interior spaces or damaging or destroying features or finishes that are character-defining while trying to correct structural deficiencies in preparation for the new use.

Installing new mechanical and electrical systems or equipment in a manner which results in numerous cuts, splices, or alterations to the structural members.

Inserting a new floor when such a radical change damages a structural system or obscures or destroys interior spaces, features, or finishes.

Inserting new floors or furred-down ceilings which cut across the glazed areas of windows so that the exterior form and appearance of the windows are radically changed.

Damaging the structural system or individual features, or radically changing, damaging, or destroying character-defining interior spaces, features, or finishes in order to create an atrium or a light well.

Courtesy Presidio Museum, Golden Gate National Recreation Area, National Park Service

Interior Spaces

An interior floor plan, the arrangement and sequence of spaces, and built-in features and applied finishes are individually and collectively important in defining the historic character of a building. Their identification, retention, protection, and repair should be given prime consideration in every rehabilitation project. In evaluating historic interiors prior to rehabilitation, it should be kept in mind that interiors are comprised of a series of primary and secondary spaces. This is applicable to all buildings, from courthouses to cathedrals, cottages, and office buildings.

Primary spaces, including entrance halls, parlors or living rooms, assembly rooms, and lobbies, are defined not only by their features and finishes, but by the size and proportion of the rooms themselves — purposely created to be the visual attraction or functioning "core" of the building. Care should be taken to retain the essential proportions of primary interior spaces and not to damage, obscure, or destroy distinctive features and finishes.

Secondary spaces include areas and rooms that "service" the primary spaces and may include kitchens, bathrooms, mail rooms, utility spaces, hallways, fire stairs, and work spaces in a commercial or office building. Extensive changes can often be made in these less important areas without detrimental effect on the overall historic character.

The Presidio has an assortment of building types constructed over a 150-year period for diverse purposes. This range of building types has a corresponding variety of interiors, each with its own historic character. Despite the diversity, a few generalizations can be made that apply to nearly all Presidio interiors:

- As they were built by a single institution governed by an undeviating sense of purpose, Presidio buildings exhibit unusually consistent design.

- Overall, the buildings have a lack of pretension and a simplicity of design tied equally to tradition and to function. The decorative simplicity of Presidio interior spaces should not be confused with a lack of significance. Original finishes and spaces, though simple, may be highly significant.

- Interiors were built using standard construction and machine-made finish materials chosen for durability, ease of assembly, and low maintenance.

- A distinctive feature in many Presidio buildings is the effective natural lighting of the spaces.

Interior Spaces

Warehouses and other industrial buildings at the Presidio are similar in character and quality of construction to buildings by other institutional builders, such as railroads and large industrial concerns. The interiors of the industrial buildings and shops are open-plan spaces with exposed structural elements and generous floor-to-ceiling heights to accommodate machinery and cranes. Industrial glazing and roof monitors or skylights allow the maximum amount of natural light into the center of the clear-span space. The large warehouses are distinguished from other industrial buildings by their lower ceilings, few exterior openings, and correspondingly lower light levels. Regularly spaced structural columns (usually wood with diagonal bracing) give order to the open-plan spaces.

Recreational and community buildings, including both the noncommissioned officers' and officers' clubs, the gymnasiums, the churches, and the theater, generally have one large multistory space with smaller rooms servicing the major space. These buildings are often embellished with abbreviated stylistic features that suggest their civilian counterparts.

Like most contemporary office buildings elsewhere, the older office buildings at the Presidio have a basic floor plan consisting of a double-loaded corridor with individual offices opening off both sides and occasionally an open, undivided office area. Transom windows over the office doorways maximize natural light and ventilation into the central corridor.

Presidio buildings contain some unique interior features, such as this mural dating from the 1950s.

Interior Spaces

A distinctive feature in many Presidio interiors is the effective use of natural lighting.

The interiors of shops and warehouses are usually open, unadorned spaces with exposed structural elements. While this type of space could be put to a variety of uses, the generous floor-to-ceiling height, exposed truss system, and natural lighting from roof monitors (or skylights) are important character-defining features which should be retained in the rehabilitation process. In this example, the skylight was painted over.

The hierarchy within the Army is most evident in the residences. Officers' housing is larger, crafted more carefully, and of more expensive materials than housing constructed for the lower ranks. Family quarters are traditional in plan and details. Design of many residences reflects the social ideas of the time. Formal living patterns are indicated by the arrangement of interiors, with a hierarchy established by separation of formal and service circulation (often reinforced by separate stairs), room size and location (servant rooms in the attics of housing for the highest ranking officers), and choice of finish materials. In contrast, the barracks are large, multistory buildings which initially had open plans punctuated by cast iron interior columns and open stairwells.

Many buildings on the Presidio have been altered over time by the Army to accommodate new uses, rarely with any sensitivity to the historic architectural features. The method of remodeling used consistently by the Army has been one of making additive changes rather than demolition and reconstruction with new interior finishes. Consequently, although a space has been remodeled, the original finishes or elements often remain. In many cases later alterations blocked the original natural light source. New mechanical and electrical systems have been hidden by dropped ceilings of acoustical tiles and fluorescent light panels, or pressed panel board partitions, obscuring historic features and finishes and changing the original proportions of spaces. Some of the large open-plan barracks have been converted to offices with partition walls dividing the once-large spaces into small offices. Because these alterations are often superficial, in many cases they could easily be reversed. Overall, historic housing has suffered the fewest alterations.

With the Army's departure and as the Presidio buildings change uses, alterations will be needed, but the new uses should be chosen so that only minimal change to the original building is required, especially for those buildings with intact significant interiors. Historic interiors currently obscured by overlying nonhistoric finishes are considered intact. Greater freedom for new design can be taken with those buildings having less sensitive interiors.

For all buildings, sustainable design requires that finishes and treatments be environmentally sound and that nonrenewable materials be avoided. Solvent-based or nonbiodegradable coatings and cleaning agents must be avoided, as should such materials as adhesives and synthetics containing toxins or off-gas volatile organic compounds that contribute to indoor air and atmosphere pollution. The use of flexible elements in the design of the space, such as furniture systems as opposed to permanent partitions, may extend the usefulness of an interior and prevent further alterations. Additionally, making reversible changes in historic spaces is always an important consideration in sustainable design.

Recommended

Interior Spaces
Identify, Retain, and Preserve

Identify, retain, and preserve a floor plan or interior spaces that are important in defining the overall historic character of a building. This includes the size, configuration, proportion, and relationship of rooms and corridors; the relationship of features to spaces; and the spaces themselves, such as lobbies, reception halls, entrance halls, double parlors, theaters, auditoriums, and important industrial or commercial use spaces.

Determine a compatible use for the building that will require only minimal alteration. It is critical that the new use not require substantial alteration of the historic plan, distinctive spaces, or character-defining architectural features or finishes.

Identify secondary spaces or nonsignificant areas and features which can be altered.

Conduct on site investigations and research as necessary to identify original floor plan configurations.

Not Recommended

Radically changing a floor plan or interior spaces —including individual rooms—that are important in defining the overall historic character of the building such that the character is diminished.

Altering the floor plan by demolishing principal walls and partitions to create a new appearance.

Altering or destroying interior spaces by inserting floors, cutting through floors, lowering ceilings, or adding or removing walls.

Relocating an interior feature such as a staircase so that the historic relationship between features and space is altered.

Blocking natural light sources that contribute to the character of the interior spaces by changing floor plans or interior spaces.

Open stairways are an integral part of many Presidio interiors. If a second means of egress is required, consider constructing new stairs in secondary spaces. Fire-retardant coatings such as intumescent paints, fire suppression systems such as sprinklers, and the construction of glass enclosures can in many cases permit retention of stairs and other character-defining features.

Interior Spaces

During an earlier remodeling project, historic plaster was removed from interior perimeter walls, exposing the brick. When finishes are removed from historic masonry walls, historic finish is lost, and the exposed unfinished walls give the interior an appearance it never had historically.

Recommended

Interior Features and Finishes
Identify, Retain, and Preserve

Identify, retain, and preserve interior features and finishes that are important in defining the overall historic character of the building, including columns, cornices, baseboards, fireplaces and mantels; panelling, light fixtures, hardware, flooring; wallpaper, plaster, paint, and finishes such as stenciling, marbling, and graining; and other decorative materials that accent interior features and provide color, texture, and patterning to walls, floors, and ceilings.

Conduct on site investigations and research as necessary to identify original elements, including those hidden by remodeling.

Identify significant finishes which must remain in place as well as those areas of finish which can be dismantled and reconstructed with minimal damage.

Retain the original exposed finish in industrial and warehouse buildings. Areas of new finish should be discreetly detailed and separated from existing exposed finishes.

Not Recommended

Removing or radically changing features and finishes that are important in defining the overall historic character of the building such that the character is diminished.

Installing new decorative material that obscures or damages character-defining interior features or finishes.

Removing paint, plaster, or other finishes from historically finished surfaces to create a new appearance (e.g., removing plaster to expose masonry surfaces such as brick walls or a chimney piece).

Applying paint, plaster, or other finishes to surfaces that have been historically unfinished to create a new appearance.

Stripping paint to bare wood rather than repairing or reapplying grained or marbled finishes to features such as doors and panelling.

Radically changing the type of finish or its color, such as painting a previously varnished wood feature.

Recommended

Protect and Maintain

Protect and maintain masonry, wood, and architectural metals which comprise interior features through appropriate surface treatments such as cleaning, rust removal, limited paint removal, and reapplication of protective coating systems.

Protect interior features and finishes against arson and vandalism before project work begins, erect protective fencing, board up windows, and install fire alarm systems that are keyed to local protection agencies.

Protect interior features such as staircases, mantels, or decorative finishes and wall coverings against damage during project work by covering them with heavy canvas or plastic sheets.

Install protective coverings in areas of heavy pedestrian traffic to protect historic features such as wall coverings, parquet flooring and panelling.

Remove damaged or deteriorated paints and finishes to the next sound layer using the gentlest method possible, then repaint or refinish using compatible paint or other coating systems.

Not Recommended

Failing to provide adequate protection to materials on a cyclical basis so that deterioration of interior features results.

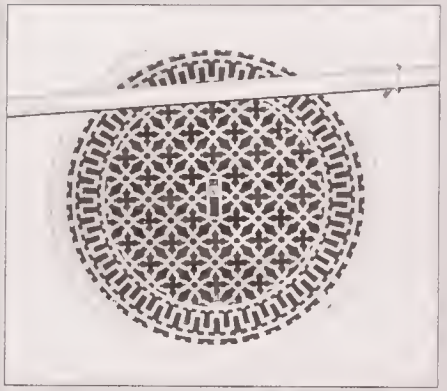
Permitting entry into historic buildings through unsecured or broken windows and doors so that the interior features and finishes are damaged by exposure to weather or through vandalism.

Stripping interiors of features such as woodwork, doors, windows, light fixtures, copper piping, or radiators; or of decorative materials.

Failing to provide proper protection of interior features and finishes during work so that they are gouged, scratched, dented, or otherwise damaged.

Failing to take new use patterns into consideration so that interior features and finishes are damaged.

Using destructive methods such as propane or butane torches or sandblasting to remove paint or other coatings. These methods can irreversibly damage the historic materials of interior features.



The tangible reminders of earlier mechanical and electrical systems—decorative cast iron radiators, grilles, light fixtures, switchplates, and bathtubs—contribute to the overall character of a building and should be retained in place, even if the systems themselves are obsolete or need upgrading. Typically these elements can be integrated into upgraded systems and remain functional.

Interior Spaces

Fragments of a historical interior sometimes remain when most of the features have been destroyed by past alterations. The intact portion could be used as a model to replicate the missing parts and restore the original interior. Here, some wainscot was removed when the gas heater was installed, but could be replaced using the remaining wainscot as a reference.

Recommended

Repaint with colors that are appropriate to the historic building.

Limit abrasive cleaning methods to certain industrial or warehouse buildings where the interior masonry or plaster features do not have distinguishing design, detailing, tooling, or finishes; and where wood features are not finished, molded, beaded, or worked by hand. Abrasive cleaning should be considered only after other, gentler methods have been proven ineffective.

Evaluate the overall condition of materials to determine if protection and maintenance are sufficient, or if repairs to interior features and finishes are necessary.

Undertake paint analysis to determine historic finishes for historically significant spaces. It is unlikely that any historic coating remains uncovered, because the Army followed a regular maintenance program. Paint samples should be taken from the least obtrusive location possible.

Consider stripping old layers of paint before undertaking repainting. Multiple paint layers may have dulled molding profiles and patterns on some significant features, such as pressed-metal ceilings. Stripping procedures should be gentle enough to remove paint without damaging the substrate. All necessary precautions must be taken against exposure to lead-containing paint.

Not Recommended

Using new paint colors that are inappropriate to the historic building.

Changing the textures and patina of character-defining features through sandblasting or use of abrasive methods to remove paint, discoloration or plaster. Exposed wood (including structural members) and masonry are both vulnerable to this kind of change.

Failing to undertake adequate measures to assure the protection of interior features and finishes.

Using harsh cleaning agents that can change the appearance of historic materials such as wood.

Attaching new materials to historically significant elements, such as carpeting over wood or tile floors, in a manner either destructive to the original material or in any way not fully reversible.

Recommended

Repair

Repair interior features and finishes by reinforcing the historic materials. Repair will also generally include the limited replacement in kind— or with compatible substitute material—of (1) extensively deteriorated or missing parts of repeated features, when there are surviving prototypes such as stairs, balustrades, wood panelling, or columns, (2) decorative wall coverings, (3) ornamental tin ceilings, or (4) plaster ceilings.

Identify sources of moisture infiltration and correct deficiencies. Make timely repairs. Moisture infiltration, from roof leaks or faulty heating and plumbing systems, is the most prevalent cause of damage to interior materials. Besides damaging historic fabric, leaks or other problems can disturb intact paint surfaces, exposing layers of lead-containing paint that may pose a danger to building occupants.

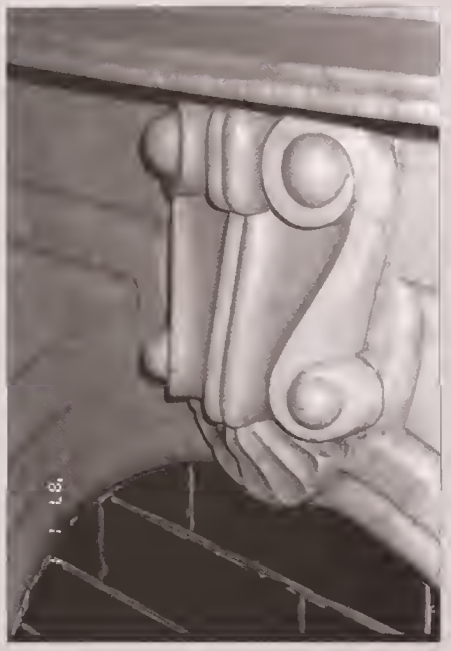
Repair damaged plaster or replace it in kind whenever possible. Gypsum wallboard may be acceptable in some cases.

Consider removing partitions and restoring the rooms to their original proportions if rooms have been subdivided through an earlier insensitive renovation.

Not Recommended

Replacing an entire interior feature (such as a staircase, panelled wall, parquet floor, or cornice); or finish (such as a decorative wall covering or ceiling), when repair of materials and limited replacement of such parts are appropriate.

Using a substitute material for the replacement part that does not have the appearance of the surviving parts or portions of the interior feature or finish or that is physically or chemically incompatible.



Particularly in residences, features such as metal ceilings, fireplaces, and door and window moldings are intact. These should be carefully protected and maintained as part of any rehabilitation.

Furring walls and suspending ceilings for the sole purpose of hiding ductwork, wiring or insulation, can change a room's proportions and can also destroy or obscure significant decorative detailing. Original features probably remain beneath the ceiling, panelling, and flooring shown above and could be rehabilitated.

Recommended

Examine existing fabric and original floor plans closely to determine whether alterations have covered historic features without destroying them. If the changes themselves have not acquired significance, alterations may be removed and repairs made to return the interior to its historic appearance.

Remove nonhistoric carpet, vinyl tile or other floor covering that obscures historic wood.

Replace

Replace in kind an entire interior feature or finish such as wainscoting, a tin ceiling, or interior stairs, that is too deteriorated to repair—if the overall form and detailing are still evident —using the physical evidence as a model. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.

Replace inappropriate additions that have deteriorated with historically appropriate features and finishes; do not replace in kind.

Not Recommended

Removing a character-defining feature or finish that is beyond repair and not replacing it; or replacing it with a new feature or finish that does not have the same appearance.

Recommended

Design for Missing Historic Features

Design and install a new interior feature or finish if the historic feature or finish is completely missing. Missing partitions, stairs, elevators, lighting fixtures, and wall coverings may be designed, or even entire rooms, if all historic spaces, features, and finishes are missing or have been destroyed by inappropriate "renovations." The design may be a restoration based on historical, pictorial, and physical documentation; or it may be a new design that is compatible with the historic character of the building, district, or neighborhood.

Alterations/Additions for the New Use

Accommodate service functions such as bathrooms, mechanical equipment, and office machines required by the building's new use in secondary spaces such as first floor service areas or on upper floors.

Reuse decorative material or features that have had to be removed during the rehabilitation work, including wall and baseboard trim, door molding, panelled doors, and simple wainscoting; relocate such material or features in areas appropriate to their historic placement.

Not Recommended

Creating a false historical appearance because the replaced feature is based on insufficient physical, historical, and pictorial documentation or on information derived from another building.

Introducing a new interior feature or finish that is incompatible with the scale, design, materials, color, and texture of the surviving interior features and finishes.

Dividing rooms, lowering ceilings, and damaging or obscuring character-defining features such as fireplaces, niches, stairways, or alcoves, so that a new use can be accommodated in the building.

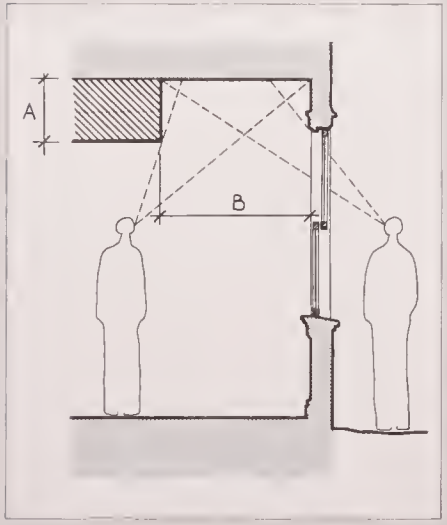
Discarding historic material that can be reused within the rehabilitation project, or relocating it in historically inappropriate areas.

Installing permanent partitions that damage or obscure character-defining spaces, features, or finishes.

Many of the Presidio office buildings have a basic floor plan consisting of a double-loaded corridor with office entrances on both sides. Transom windows above the doors allow natural light and ventilation into the corridors. The original floor-to-ceiling height in the corridors should be preserved and new ductwork installed in less important secondary spaces. Locations of original light fixtures are still evident in the pressed ceiling panels. When hanging fluorescent fixtures are removed, historically appropriate fixtures should be installed in the original locations.

Interior Spaces

Some Presidio buildings have lost some or all of their historic finishes. In such cases, new finishes and features should be contemporary but compatible with remaining historic fabric and style.



If a dropped ceiling is required, minimize the space above it (A) and maximize its distance from windows (B) to maintain perception of original space and ceiling and to avoid conflicts with historic windows.

Recommended

Install permanent partitions in secondary spaces; removable partitions that do not destroy the sense of space should be installed when the new use requires the subdivision of character-defining interior space.

Enclose an interior stairway where required by code so that its character is retained. In many cases, glazed fire-rated walls may be used.

Place new code-required stairways or elevators in secondary and service areas of the historic building.

Create an atrium or a light well to provide natural light when required for the new use in a manner that preserves character-defining interior spaces, features, and finishes as well as the structural system. Inserting a new atrium or lightwell is appropriate only in very limited situations where the existing interiors are not historically or architecturally distinguished.

Add a new floor only if required for the new use in a manner that preserves character-defining structural features, and interior spaces, features, and finishes.

Document existing interior spaces and features photographically prior to rehabilitation.

Not Recommended

Enclosing an interior stairway with fire-rated construction so that the stairwell space or any character-defining features are destroyed.

Radically changing, damaging, or destroying character-defining spaces, features, or finishes when adding new code-required stairways and elevators.

Destroying character-defining interior spaces, features, or finishes; or damaging the structural system in order to create an atrium or light well.

Inserting a new floor within a building that alters or destroys the fenestration; radically changes a character-defining interior space; or obscures, damages, or destroys decorative detailing.

Cutting through floors, ceilings, or walls in a way that changes character-defining spaces, features, or finishes.

Furring out perimeter walls for insulation or other purposes. This requires unnecessary removal of window trim and can change a room's proportions. Consider alternative means of improving thermal performance, such as installing insulation in attics and basements, if these spaces are not historically significant, or reducing air infiltration by various means such as adding storm windows or weather stripping.

Recommended

Recycle materials whenever possible. If historic materials must be removed, they should be stockpiled and made available for other Presidio projects.

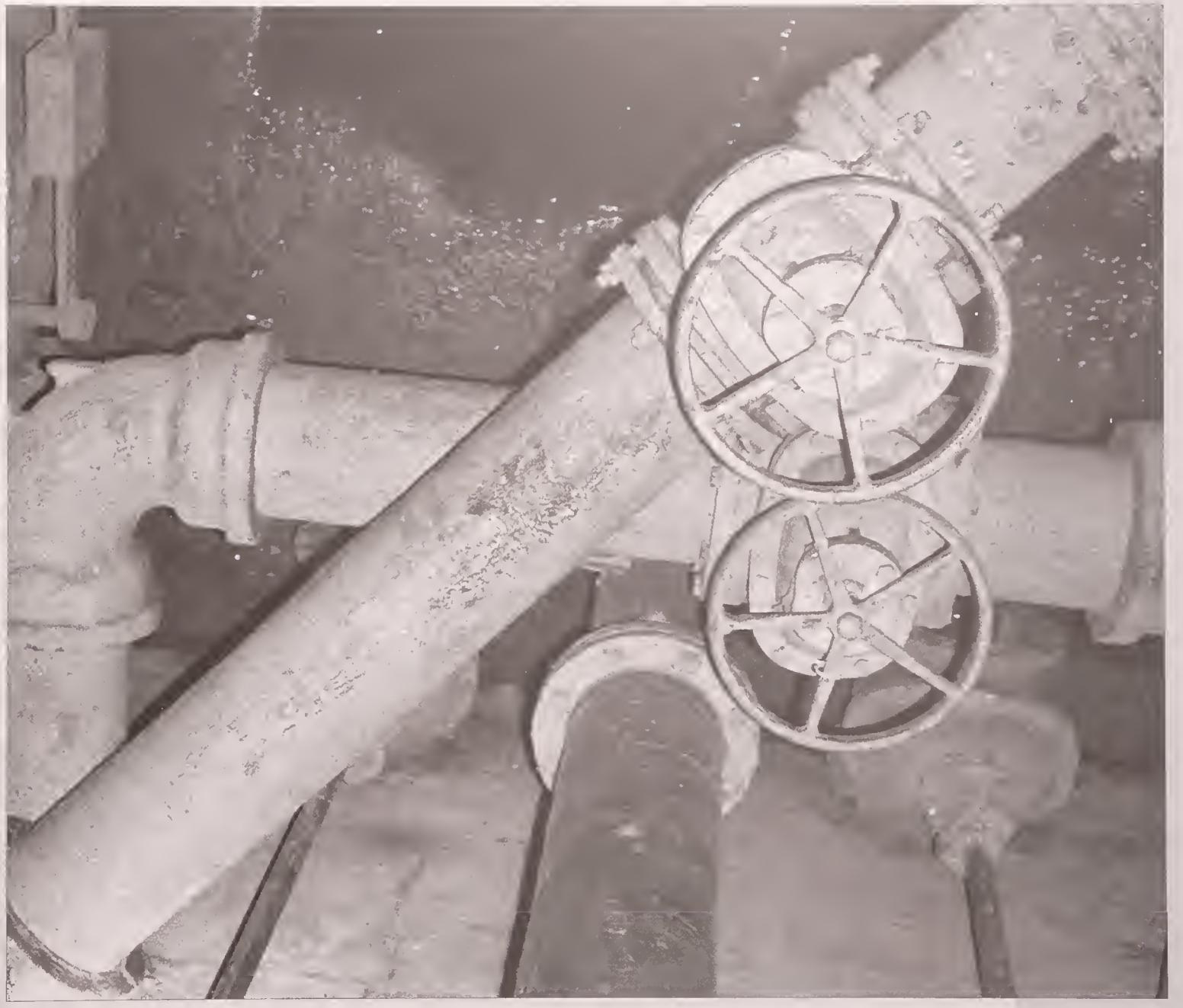
Consider reconfiguring toilet rooms. Most buildings have large, single-sex facilities which reflect the past population of the Presidio. These may need to be altered to serve both men and women. An additional consideration is the accommodation of the disabled.

Design dropped ceilings to be set well back from the windows so they do not obstruct them and are not visible from the exterior. Dropped ceilings are appropriate only in spaces that are not character-defining.

Retain the original floor-to-ceiling height in primary spaces when installing fire protection, improved mechanical systems, or upgraded electrical systems. Locate new work in less significant secondary spaces.

Make a clear distinction between new and old construction. New work (registers, grilles, hardware, and trim) should be compatible with the historic character of the interior, but should be distinguishable from the original material. New work also should be reversible (removable later with no damage to the building's significant elements).

Insertion of an intermediate floor is only suitable if it does not permanently damage the character-defining features of the space. Above is an example of an added floor that utilizes the open structure and height of the gymnasium space without interfering with the windows. However, this floor addition has radically altered the original open space and may not be reversible.



Mechanical and Electrical

Mechanical, lighting, and plumbing systems improved significantly with the coming of the Industrial Revolution. The 19th-century interest in hygiene, personal comfort, and the reduction of the spread of disease was met with the development of central heating, piped water, piped gas, and networks of underground cast iron sewers. Vitreous tiles in kitchens, baths, and hospitals could be cleaned easily and regularly. The mass production of cast iron radiators made central heating affordable to many; some radiators were elaborate and included special warming chambers for plates or linens. Ornamental grilles and registers provided decorative covers for functional heaters in public spaces. By the turn of the 20th century, it was common to have all of these modern amenities in a building.

The greatest impact of the 20th century on mechanical systems was the use of electricity for interior lighting, forced air ventilation, elevators for tall buildings, exterior lighting, and heat. The new age of technology brought an increasingly high level of design and decorative art to the functional elements of mechanical, electrical, and plumbing systems.

The visible decorative features of historic mechanical systems such as grilles, lighting fixtures, and ornamental switchplates may contribute to the overall historic character of the building and should be retained and repaired whenever possible. Identification of these features should take place early in project planning, together with an evaluation of their physical condition. On the other hand, the functioning parts of many older systems, such as compressors, their ductwork, wiring, and pipes may often need to be upgraded or entirely replaced in order to accommodate the new use and to meet code requirements.

Although mechanical and electrical systems at the Presidio may range from rudimentary to sophisticated, the majority are relatively basic. Over the years, the Army made improvements to building systems based upon the changing functional needs of the occupants. Systems were augmented or replaced as technological advances or changes in occupancy occurred. Electric lights replaced gas lamps; gas-fired heaters replaced coal furnaces; internal plumbing replaced outhouses, pumps and cisterns; and new systems were introduced, such as the telephone; unit or central air conditioning; computer networks; and cable and satellite communications. With each advance came new equipment, with new wires, pipes, and controls, often installed without removing outdated equipment. The Army made little attempt to conceal systems, so in many Presidio buildings the developments remain clearly visible, and historic elements have been to some degree preserved. Attempts to conceal systems are frequently the cause of significant damage to historic fabric, but at the Presidio the minimal damage incurred can generally be repaired and restored.

These guidelines emphasize issues of existing nonhistoric mechanical and electrical systems in historic buildings, which is a typical characteristic of buildings at the Presidio. They augment the Secretary of Interior's Standards for mechanical and electrical systems, which are orientated toward preserving historic systems and incorporating new systems in historic buildings.

- Many Presidio buildings have insufficient electrical service for their current uses.
- Many buildings have inadequate lighting for their present occupancy. In addition, the lighting, whether historic or nonhistoric, is not energy efficient.

- HVAC systems are frequently hybrids (e.g., gas boilers, electric baseboard heaters, and window air conditioning units) that are both inefficient and redundant.

- Supply and distribution systems (ducts, pipes, conduit, and wiring) are generally exposed, and in many cases, deteriorated.

- Much of the equipment, though currently functional, is well past its designed life span.

- Most importantly, many Presidio systems are not currently compliant with the codes the National Park Service will be employing. The extent of work must be coordinated with the Park Service. Although all safety hazards must be eliminated, full code compliance may not be required in every case.

The National Park Service intends to showcase its commitment to sustainable design at the Presidio and a major component of sustainable design is energy conservation. Mechanical and electrical systems are major consumers of energy and they can be upgraded to reduce consumption. Among the many strategies for reducing energy consumption are the following general guidelines:

- Carefully match the proposed building program to the existing building so the need for additional light, ventilation, or heating is minimized.

- Since most Presidio buildings were originally designed to take advantage of natural light and ventilation, there should be little need for air conditioning if windows are operable and adequate ventilation is provided.

- Explore the use of storm windows and insulation to reduce demand on existing mechanical systems.

- Perform routine maintenance, such as cyclical cleaning of filters to assure the optimal efficiency as well as longevity of a system.

- Rehabilitate and reuse existing equipment whenever possible with the exception of inefficient HVAC systems, motors and hot water heaters.

- Recycle elements that must be replaced. Any new equipment should be highly efficient and have low maintenance requirements.

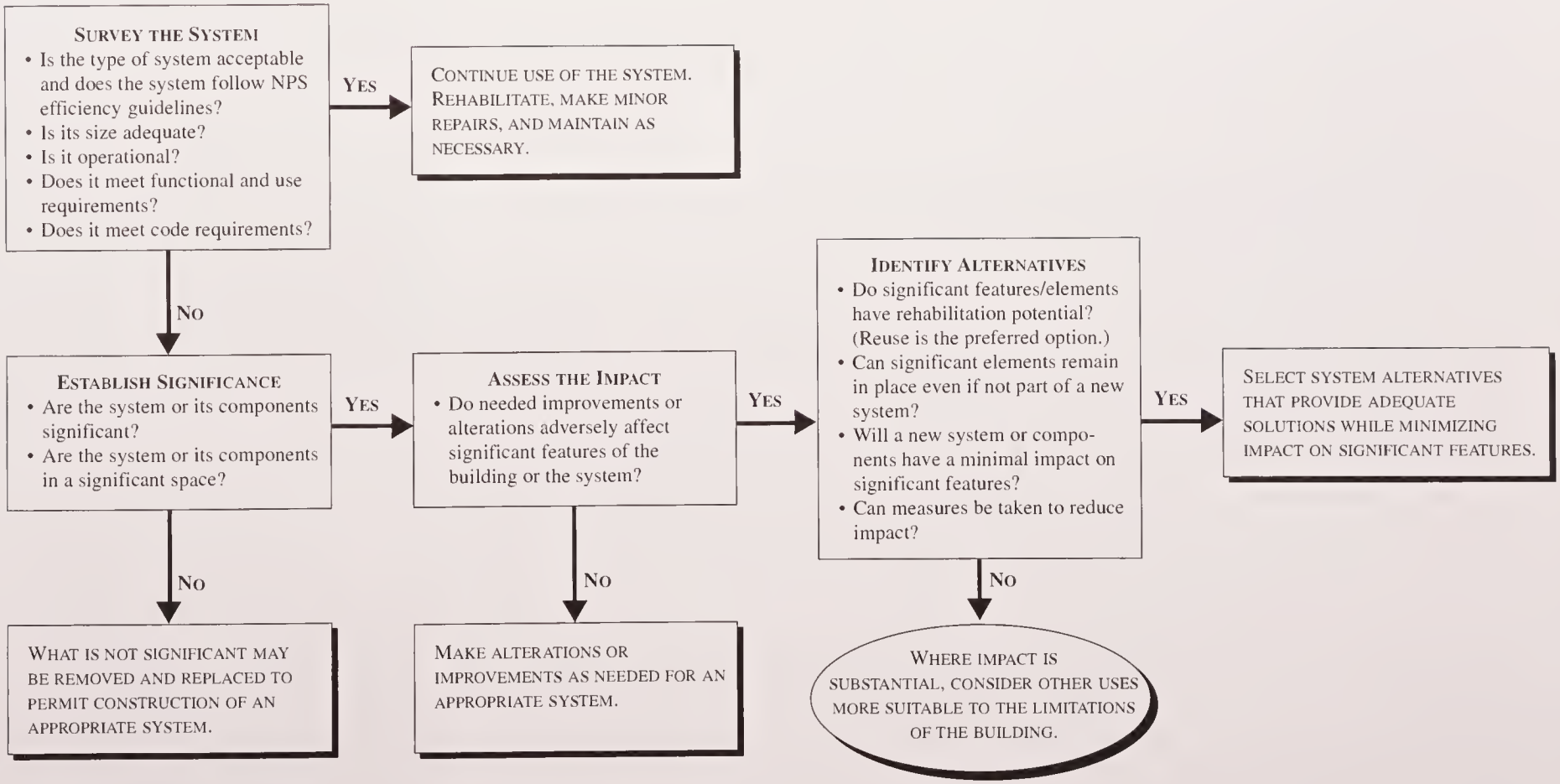
- Carefully consider specific building uses when planning for new building systems; heating and illuminating the entire building may not always be necessary when zoned heating and task lighting may satisfy the occupant's needs.

A thorough understanding of both preservation and sustainable design will inform the design solution for these issues.

In many residences, early steam or hot water heating systems remain, including radiators. These are frequently appropriate for continued use. In some cases, the addition of individual thermostats at the radiators may be necessary.

Undisciplined wiring is a problem throughout the Presidio. It can pose fire and safety hazards and is frequently a visual distraction in significant spaces.

Mechanical and Electrical



Mechanical and Electrical

Recommended

Identify, Retain, and Preserve

Identify, retain, and preserve visible features of early mechanical systems that are important in defining the overall historic character of the building, such as radiators, vents, fans, grilles, plumbing fixtures, switchplates, and lights.

Analyze each existing system for safety, energy conservation, and cost effectiveness, as well as for historic significance. Review the building background data and confer with the Park Service to assess each system. Many systems have some components that may be considered historically significant.

Employ professional engineering consultants with experience in retrofitting systems in historic buildings. Ensure mechanical and electrical subcontractors are qualified and experienced in such work.

Not Recommended

Removing or radically changing features of mechanical systems that are important in defining the overall historic character of the building such that the character is diminished.

Determining the significance of an existing system without proper research.

Removing abandoned obsolete systems or equipment before they have been assessed and, if significant, documented.

Vestiges of defunct systems, such as this abandoned exhaust flue, can be character-defining features. The decision to keep or remove such elements should be made only after their significance is determined.

Mechanical and Electrical

The Presidio microclimate can cause rapid corrosion of exterior equipment and piping, particularly in exposed locations. Regular maintenance of all such equipment is critical.

Grilles such as this are found in many of the older buildings. They should be repaired and maintained even if they are no longer functional. Where possible, electrical receptacles such as the one shown should be replaced with better integrated elements: conduit could be concealed behind wood base.

Recommended

Protect and Maintain

Protect and maintain mechanical, plumbing, and electrical systems and their features through cyclical cleaning and other appropriate measures.

Prevent accelerated deterioration of mechanical systems by providing adequate ventilation of attics, crawl spaces, and cellars to avoid moisture problems.

Improve the energy efficiency of existing mechanical systems to help reduce the need for elaborate new equipment. Consider installing storm windows and awnings, if appropriate. Insulate and install vapor barriers in the attic and crawl space.

Analyze the condition of existing systems. The Army has carried out inspections and maintenance fairly regularly, but many obsolete mechanical and electrical systems have been abandoned in place. Assess how they may be preserved and adapted to new uses.

Keep systems in good working order with regular and careful maintenance. The microclimate of the Presidio is periodically very damp and foggy, providing an ideal environment for corrosion.

Not Recommended

Failing to provide adequate protection of materials on a cyclical basis such that mechanical systems and their visible features deteriorate.

Enclosing mechanical systems in areas that are not adequately ventilated such that the system deteriorates.

Installing unnecessary air conditioning or climate control systems which can add excessive moisture to the building. This additional moisture can either condense inside, damaging interior surfaces, or pass through interior walls to the exterior, potentially damaging adjacent materials as it migrates.

Proposing uses for a building that cannot be adapted to the building's thermal limitations (e.g., lack of insulation).

Installing new vents or louvers rather than adapting existing ones.

Allowing existing plumbing systems to deteriorate. Water infiltration from leaks is a major cause of deterioration of building materials.

Recommended	Not Recommended
Secure all equipment, gas, water, and electric lines for safety, as the Presidio lies in an active earthquake zone.	
Retain attic louvers for passive attic ventilation; where appropriate, they may be incorporated into new heating, ventilation, and air conditioning systems.	
Retain and maintain system components that visually contribute to the character of a room or space, such as light fixtures, radiators, and floor or wall air distribution grilles. If this is not possible, rehabilitate or replace them in kind.	
Consider remodeling of bathrooms on a case-by-case basis, retaining original fixtures where possible.	
Repair	
Repair mechanical systems by augmenting or upgrading system parts; for example, installing new pipes and ducts, or adding new compressors or boilers.	Replacing a mechanical system or its functional parts when it could be upgraded and retained.
Provide proper venting for heating and plumbing systems. Existing skylights, transoms, and clerestories may be used to ventilate spaces naturally.	Replacing equipment or pipes that may simply require cleaning and treatment for continued use. Corrosion, frequently found in plumbing and heating equipment and piping, may be only a surface condition.

The attic louver on this small building is a significant feature that serves an important function for the health of the building. Electrical wiring detracts from the building's historic exterior.

Transoms, as well as skylights and clerestories, can provide needed light and ventilation and should be maintained in good working order. Note also the ad hoc method of wiring found throughout the Presidio.

Mechanical and Electrical

Heating equipment is frequently located in attic spaces with inadequate ventilation. This situation must be remedied, by reactivating existing louvers or vents, installing new ones, or, if required, relocating equipment

The pressed metal ceiling is a significant feature of this room. The installation of suspended light fixtures has damaged the ceiling. These fixtures should be removed and lighting more appropriate to the space should be installed.

Recommended

Return all originally operable windows to functional condition.

Remove paint from painted-over skylights or transoms to restore natural light to the interior.

Provide mechanical ventilation for interior rooms and spaces that currently have inadequate ventilation.

Establish the elimination of fire hazards as a priority. Some existing systems pose fire hazards due to their composite nature, lack of clearances, or overloading.

Replace

Replace in kind—or with compatible substitute material—visible features of mechanical systems that are either extensively deteriorated or are prototypes, such as ceiling fans, switchplates, radiators, grilles, or plumbing fixtures.

Replace inappropriate light fixtures with energy-efficient fixtures that are compatible with the historic spaces, finishes, and character.

Remove surface-mounted elements such as pipes, wires, conduits, ducts, and cables that have been surface-mounted over historic finishes. Where they are necessary components of operational systems, replace them or reinstall them in a manner appropriate to the particular building.

Not Recommended

Blocking or painting over skylights, clerestories, or transoms.

Installing a replacement feature that does not have the same appearance.

Replacing in kind nonhistoric systems or equipment. Many systems at the Presidio have no historic value and are, in fact, detrimental to the historic character of a building, particularly its exterior facades. Such equipment should be removed and alternate locations or alternative systems should be provided.

Recommended

Alterations/Additions for the New Use

Install a completely new mechanical system if required for the new use such that it causes the smallest possible alteration to the building's floor plan, and to the exterior elevations, and the least damage to the historic building material.

Provide adequate structural support for new mechanical equipment.

Install the vertical runs of ducts, pipes, and cables in closets, service rooms, and wall cavities.

Install air conditioning units, if required by the new use, such that historic features are not damaged or obscured and excessive moisture that would accelerate deterioration of historic materials is not generated.

Install heating and air conditioning units in the window frames in such a manner that the sash and frames are protected. Window installations should be considered only when all other viable heating or cooling systems would result in significant damage to historic materials.

Not Recommended

Installing a new mechanical system so that character-defining structural or interior features are radically changed, damaged, or destroyed.

Failing to consider the weight and design of new mechanical equipment such that historic structural members or finished surfaces are weakened or cracked.

Installing vertical runs of ducts, pipes, and cables in places where they will obscure character-defining features.

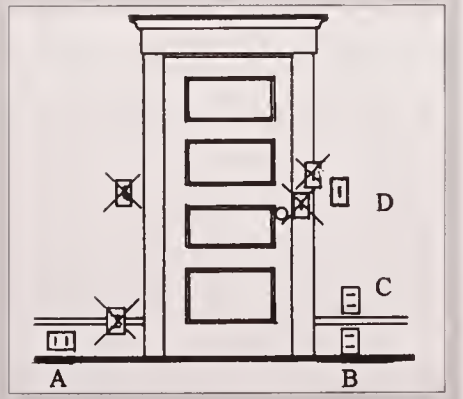
Concealing mechanical equipment in walls or ceilings in a manner that requires removal of historic building material.

Lack of planning has resulted in frequent situations such as this hazardous juxtaposition of a drinking fountain and electrical wires, and conflict between the placement of furnishings and heating units.

Window air conditioning units are not appropriate for use in historic facades. These units should be removed and an alternative system for cooling, if needed, should be designed.

Mechanical and Electrical

These heating supply pipes have been installed in the lobby of a historic building. Their placement has had a major negative impact on the space. They should be removed and the system redesigned to allow a concealed, or less obtrusive distribution.



The installation of new electrical switches and receptacles should be as unobtrusive and nondestructive of historic fabric as possible. A, B, and D are preferred; C is also acceptable.

Recommended

Carefully determine new uses to ensure that a building is suitable for conversion to the new use without serious impact on the historic fabric due to the introduction of necessary systems. All new systems added to a historic building must be reversible.

Design all new systems with a view toward their life span. By using the best components and planning for future growth and technological changes, future alterations and possible further damage to the historic building can be avoided.

Determine whether adding heating or air conditioning systems is appropriate. Some Presidio buildings originally designed for storage or industrial use were not intended for full-time human occupancy. If the building's internal environment is altered through the addition of heat or air conditioning, historic building materials may be adversely affected. Keep alterations to the minimum necessary for the occupancy.

Bring services into a building underground, where possible. Penetrations for ducts, vents, or fans, when required, should be located in existing openings on secondary facades or rear roof planes.

Not Recommended

Installing dropped acoustical ceiling to hide mechanical equipment when this ruins the proportions of character-defining interior spaces.

Cutting through features such as masonry walls in order to install air conditioning units.

Radically changing the appearance of the historic building or damaging or destroying windows by installing heating or air conditioning units in historic window frames.

Locating necessary new equipment rooms, elevators, or toilet facilities without carefully assessing their impact on historic spaces. Choose locations that allow maximum preservation of historic features.

Designing any new systems before the actual use and occupancy of a building are known, to prevent overdesign of systems and unnecessary damage to the historic fabric.

Creating new penetrations of the building envelope to accommodate mechanical equipment.

Mechanical and Electrical

Recommended

Consider alternative architectural changes to create a comfortable interior environment (such as adding insulation, natural lighting and ventilation, storm windows, control devices, or lowering heat output from lighting) rather than designing new systems to satisfy all needs.

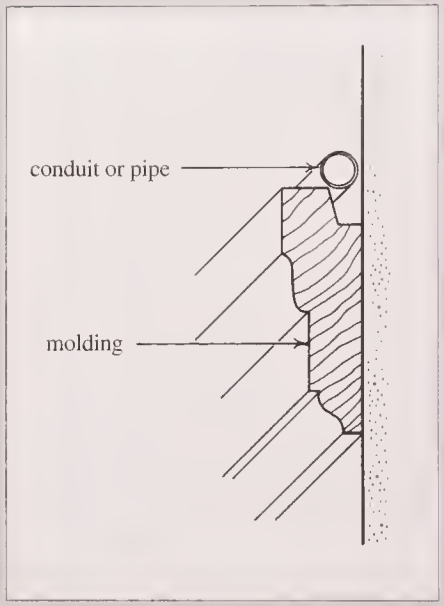
Reduce the visual impact of new equipment; when there is no suitable space within a building, certain equipment such as transformers and heat pumps should be installed at remote locations.

Determine the appropriate treatment for installation of new systems. In utilitarian buildings with no spaces to conceal new systems, exposed systems, carefully designed and detailed, and installed in such a way as to limit damage to historic features and finishes, may be appropriate. In more refined buildings, systems that must be installed in visible locations will be less intrusive if equipment is placed in less significant spaces and if existing architectural features such as cornices or baseboards are used to obscure new wires or pipes.

Coordinate installation of any equipment that may affect the exterior appearance of a building or site with the National Park Service.

Not Recommended

Installing highly visible communication equipment. Antennas and satellite dishes can be major intrusions in the historic landscape.



In many buildings at the Presidio, interior or exterior trim pieces such as cornices or moldings may be used to minimize the visual impact of new conduits or pipes.

Mechanical and Electrical

The placement of antennas and satellite dishes must be done with regard to the historic context. The equipment shown above and below creates a strong negative impact on these important buildings; a less obtrusive location should be sought.

Recommended

Plan for future needs. Any renovation must plan for the need to eventually replace partial or entire systems, and where possible, should incorporate the new systems in the ongoing work. Where a new system cannot be included as a part of a renovation project, make provisions that will allow its future installation without further damage to the historic fabric, e.g., use in-wall conduit with pull wires for future data and communication lines.

Energy Efficiency

Energy Efficiency

Some character-defining features of a historic building or site—such as cupolas, shutters, transoms, skylights, sunrooms, porches, and plantings—also play a major energy conserving role. Prior to retrofitting historic buildings to make them more energy efficient, the first step should always be to identify and evaluate the existing historic features to assess their inherent energy conserving potential. If it is determined that retrofitting is necessary, then such work needs to be carried out with particular care to ensure that the building's historic character is preserved in the process of rehabilitation.

The rehabilitation and use of the Presidio's vast stock of historic and nonhistoric buildings will provide a unique opportunity to introduce and assess energy conserving design on a large scale and to create an exemplary sustainable community. Detailed energy efficiency guidelines for the Presidio are currently being written. These guidelines, intended for both tenants and National Park Service staff, will provide direction in the maintenance and procurement of appropriate equipment.

The temperate climate of the San Francisco Bay Area demands a much smaller energy expenditure than that of the average American city. Both winter and summer are mild, resulting in a modest heating load and little need for air conditioning for most building uses. The siting of many Presidio buildings creates a naturally pleasant environment, where hillside lots receive many hours of direct sunlight and breezes from the bay. Cold, high winds, or uncomfortably hot temperatures are rare; however, heavy fog is a regular phenomenon, especially during the summer months.

Many historic Presidio buildings also have numerous passive energy conserving features. Brick masonry walls provide the thermal inertia necessary to hold either warm or cool temperatures. Daylighting and natural ventilation feature prominently in the original building designs and the typical enclosed porches control wind and capture solar heat. Conversely, however, many buildings are uninsulated, and existing heating and electrical systems are not energy efficient. Previous alterations have also frequently increased energy consumption by blocking windows, created interior spaces without natural light or ventilation, and introduced inappropriate occupancies.

Energy Efficiency

In addition to both passive and active measures that can be introduced into building design to reduce energy consumption, another important aspect of energy conservation is that older buildings already embody energy conservation value. New construction can only require more energy because of the need for new building materials and associated transportation. All demolition and alteration consumes energy—this energy consumption is further exacerbated when the existing work being demolished or altered is well built of durable, permanent, natural materials. When new products are necessary, durable locally produced, natural and recycled materials will usually prove more energy efficient than low-quality, imported or manufactured materials.

Energy conservation goals for the Presidio are summarized as follows:

- To achieve improved energy efficiency without sacrificing historical features.
- To employ passive strategies as the first choice for energy conservation.
- To promote energy awareness among both occupants and visitors, through signs, educational programs, incentives, etc.
- To prevent waste and restrict/manage energy use.

Energy Efficiency

The sun porches found on many Presidio residences were early energy conserving features. Many porches on residences, as well as larger buildings, were later enclosed.

Roof overhangs are a feature of many Presidio buildings. They perform a valuable energy conserving function, controlling summer sunlight and allowing windows to be used for ventilation during inclement weather.

Recommended

Identify, Retain, and Preserve

Identify and evaluate existing historic features to assess their inherent energy conserving potential prior to retrofitting historic buildings to make them more energy efficient. Some character-defining features of a historic building or site—such as cupolas, shutters, transoms, skylights, sunrooms, porches, and plantings—may also play a major energy conserving role. If retrofitting is necessary, it needs to be carried out with particular care to ensure that the building's historic character is preserved in the process of rehabilitation.

Choose all new products, materials, or systems for buildings in light of their life-cycle costs. Although some may initially be more expensive, they may be more cost effective because of longevity or energy efficiency.

Educate building occupants regarding energy conservation.

Take advantage of cool breezes, natural light, or passive solar energy available due to a building's orientation. These concerns were carefully considered in most of the original Presidio designs.

Consider masonry's inherent ability to store thermal energy when assessing the need for wall insulation. Depending on orientation and exposure, a building's high level of thermal inertia can be an important energy conserving feature that might be compromised by the addition of insulation. The relative effect of wall insulation needs to be studied on a building-by-building basis.

Not Recommended

Assigning an inappropriate building use that requires high energy consumption.

Planning a new use for an uninsulated building that requires the installation of an air conditioning system without first considering the suitability of the building for such use.

Painting over or blocking a window that provides daylight or ventilation.

Removing historic interior features that play a secondary energy conserving role.

Recommended

Retain plant materials, trees, and landscape features, especially those that perform passive solar energy functions, such as sun shading and wind breaks.

Evaluate possible use of daylighting as a valuable strategy for energy conservation. Blocked or painted-over windows, clerestories, and skylights should be restored to allow daylight wherever possible. Removable devices, such as shades, shutters, and awnings, should be used to control the level of light.

Retain historic interior shutters and transoms for their inherent energy conserving features.

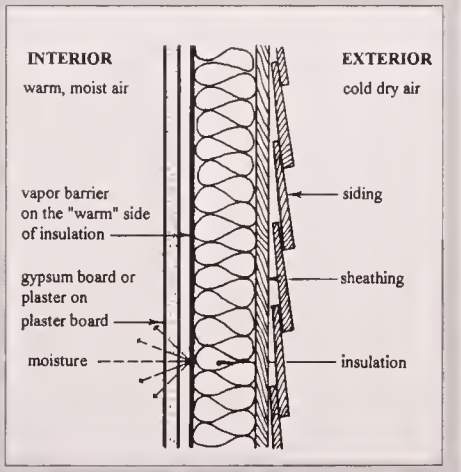
Carefully study uninsulated brick buildings at the Presidio before proposing wall insulation. Their thermal mass may already have good heating and cooling properties, which would be compromised by insulation.

The Presidio's mature landscaping plays an important role in providing passive control of sunlight and wind. Alteration of such landscaping can radically change the interior environment of nearby buildings and create a need for manufactured energy conservation solutions.

All windows should be maintained to prevent air and water infiltration. Interior thermal control devices are normally preferred to exterior devices. An interior blind is used on the window shown at right with no adverse effect on the significant exterior features of the window.

Energy Efficiency

The entrance enclosure of this building provides protection from wind and rain. While probably not an original feature, it has been carefully sized and detailed to integrate with the historic building.



Proper application of the appropriate insulation, with the vapor barrier facing the occupied space, is necessary to achieve maximum energy efficiency.

Recommended

Maintain and Preserve

Consider cyclical maintenance as one of the most important components of energy conservation design. Regular maintenance is a preventive measure against poor operation of systems, deterioration of materials, and their subsequent replacement.

Restore and maintain existing skylights to fulfill original daylighting and ventilating functions.

Use the inherent energy conserving features of a building by maintaining windows and louvered blinds in good operable condition for natural ventilation.

Restore and maintain existing transoms that enhance cross-ventilation within a building, and that may provide the only natural ventilation and daylighting to interior spaces.

Use the inherent energy conserving features of a building; maintain porches and double vestibule entrances in good condition so that they fulfill their original functions, retaining heat, blocking the sun and wind, and providing natural ventilation.

Not Recommended

Failing to regularly clean and maintain mechanical equipment and distribution systems. Lack of maintenance of mechanical systems is a major contributor to their inefficiency.

Removing historic shading devices rather than keeping them in operable condition.

Replacing historic multipaned sashes with new thermal sashes using false muntins.

Replacing windows or transoms with fixed thermal glazing or allowing windows and transoms to remain inoperable rather than using them for their energy conserving potential.

Closing off transoms when dropping a ceiling or to increase acoustic privacy.

Enclosing porches located on character-defining elevations to create passive solar collectors or airlock vestibules. Such enclosures can destroy the historic appearance of a building.

Recommended

Alterations for Energy Efficiency

Provide zoning and operational controls for all systems; regularly assess the system's performance and level of energy use.

Use reversible, environmentally sound insulation products.

Cap unused chimneys with a reversible device to minimize heat loss from within.

Ensure that attic louvers and ventilators are functional; rehabilitate and upgrade operable skylights and ventilators. Where adequate documentation exists, restore missing ventilators in their historic locations rather than installing new equipment.

Improve thermal efficiency with weather stripping, storm windows, caulking, interior shades, and—if historically appropriate—blinds and awnings.

Install interior storm windows with airtight gaskets, ventilating holes, or removable clips to ensure proper maintenance and avoid condensation damage.

Install exterior storm windows that do not damage or obscure the windows and frames.

Not Recommended

Installing freestanding solar collectors that obscure, damage, or destroy the historic landscape or archeological features.

Locating solar collectors where they radically change the property's appearance, or damage or destroy character-defining features.

Placing solar collectors on roofs where they will alter the historic roofline or obscure the relationship of other roof features, such as dormers, skylights, and chimneys.

Insulating an attic in such a way as to eliminate its natural ventilation system.

Installing rigid roof insulation that alters the profile or detailing of the roof with its additional thickness.

Installing rooftop energy conservation elements, such as ventilators or skylights, without regard for their impact on the historic fabric and appearance of the building.

Installing interior storm windows that allow accumulation of damaging moisture.

Restoration and maintenance of the roof monitor shown, which provides both daylight and natural ventilation to the building interior, will both enhance the internal environment and reduce energy use.

Fireplaces with undampered chimneys are a major source of heat loss. Nonfunctional chimneys should be covered by removable caps.

Energy Efficiency

Transoms are found in many Presidio buildings. Many of these have been painted or blocked and require restoration to fulfill their energy conserving function.

Awnings can be appropriate devices for sunlight control, particularly on residences or modest, unornamented structures such as those shown here. They should be installed in a reversible fashion.

Recommended

Consider the use of low-E glass for new or rehabilitated windows. Alternatively, apply a reversible coating to existing glazing to reduce the penetration of ultraviolet rays and heat gain.

Carefully consider the impact of proposed wall or ceiling insulation on interior finishes and features.

Incorporate energy-saving features found in many historic buildings at the Presidio—such as masonry construction, well-planned daylighting, and natural ventilation—into the design of new additions.

Install thermal insulation and vapor barriers in attics, unheated cellars and crawl spaces to conserve energy.

Not Recommended

Installing new exterior storm windows that are inappropriate in size or color, or that are inoperable.

Installing tinted or reflective glazing.

Installing wall insulation without considering window casings and trim, which will be affected by increased wall thickness.

Installing new additions, such as multistory solar greenhouses, that obscure, damage, or destroy character-defining features.

Recommended

Reduce the large amount of energy expended for lighting by:

- Using daylight wherever possible.
- Using fluorescent instead of incandescent fixtures.
- Using appropriate lighting for tasks combined with a lower level of ambient lighting.
- Implementing controls to limit lighting use, such as occupant-activated lightReduce a building's electrical load with a careful selection of energy-efficient equipment, computers, and appliances.

Reduce a building's electrical load with a careful selection of energy-efficient equipment, computers, and appliances.

Add timers, sensors, or other control systems to help reduce energy consumption.

Consider designing a program of load management—off-peak use of certain systems—as a means of saving energy.

Not Recommended

Applying urea formaldehyde foam or any other thermal insulation with a water content that may cause the collection and retention of moisture in wall cavities.

Fluorescent lighting, as shown here, is energy efficient. However, with the natural light available, this space is clearly over-lighted. Substitution of task lighting for some of the overhead fixtures will increase efficiency and be more sympathetic to the historic space.

Daylighting is an important feature of most Presidio buildings and should be maximized wherever possible. Basic incandescent lighting can be found throughout the Presidio, particularly in residences.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Accessibility Considerations

It is often necessary to modify to a historic property to comply with current accessibility code requirements. Accessibility to certain historic buildings and sites is required by the Architectural Barriers Act of 1968, Section 504 of the Rehabilitation Act of 1973, and the Americans with Disabilities Act of 1990. Federal rules, regulations, and standards provide guidance on how to provide access to meet both accessibility and historic preservation requirements. Modifications to historic properties must be carefully planned and undertaken so that they do not result in a loss of character-defining spaces, features, or finishes. The goal is to provide the highest level of access with the lowest level of impact.

The majority of buildings at the Presidio, both historic and nonhistoric, have accessibility problems— many of which present serious obstacles to use by the disabled. The National Park Service intends that every building designated for public use be fully accessible. This includes exterior and interior routes, ramps, entrances, kitchens, toilets, parking, and displays and signage.

To determine access requirements at the Presidio—in addition to those access requirements contained in the three acts mentioned above—the National Park Service follows the Uniform Federal Accessibility Standards and California Title 24, including the State Historic Building Code. In specific cases, to be determined by the National Park Service, these codes allow some latitude for compliance with regard to historic buildings.

Inherent characteristics of the Presidio site and building stock pose other challenges, such as:

- Topography—some slopes are too steep for disabled access.
- Lack of direct access to buildings that were designed and constructed prior to automobile use.
- Historically significant entrances that do not comply with current standards of accessibility.
- Features that inhibit movement through the building, such as changes of floor level, narrow doors and corridors, obstacles, lack of elevators, and noncompliant stairways.
- Toilet, bath, and kitchen deficiencies due to age and design.
- Lack of required accessibility aids, such as amenities, signage, and warning and control systems.

Accessibility Considerations

Accessibility is important in determining proposed uses; some residences are more appropriate than others for modification. For example, the need to add an elevator may preclude public uses for some smaller, multistory buildings.

Accessibility design must strike a balance between equal access and sustainability, especially the preservation and conservation of existing built resources. Barrier-free access not only promotes independence for the disabled, but also minimizes the need for duplicate facilities. Regrading for ramps to existing entries and providing accessible paved parking and paths should be accomplished sensitively to prevent adverse effects on the site. Simple solutions and additive elements should be considered before the abandonment or replacement of existing components.

Certain buildings have features that should not be altered; this building's historically significant entrance, together with its confined site bounded by roadways, may preclude modification for the disabled. In this case, a wheelchair lift at a secondary entrance is a possible alternative.

Understand the Significance of the Structure

- Determine its character-defining features; possibly prepare a historic structure report.
- Are the building or particular features, including site character and elements, significant?

↓

Identify Existing Accessibility Barriers

- Establish applicable code standards, regulations, and review processes.
- Use a comprehensive checklist survey process where possible.
- Meet with disabled access groups to discuss deficiencies.

↓

Define Code Compliant Solutions

↓

Evaluate Impacts of Code Compliance on Significant Features

- Do the solutions threaten or destroy historical character?

↓

Identify Alternative Access Design Solutions

- Analyze the impact of alternative solutions on the structure and the site.
- Consider the quality of accessibility from the viewpoint of disabled groups.
- Implement alternatives that maximize accessibility and minimize adverse effects on significant features.

Disabled Access Flow Chart

Accessibility Considerations

The successful modification of a frequently used Presidio building is shown above. The lawn was regraded to minimize the visual impact of the ramp, and a simple, complementary pipe railing was installed.

This ramp, while stylistically neutral, overpowers the modest building. It is also too steep and has a noncompliant railing.

Recommended

Identify the historic building's character-defining spaces, features, and finishes so that accessibility code-required work will not result in their damage or loss.

Comply with barrier-free access requirements in such a manner that character-defining spaces, features, and finishes are preserved.

Work with local disability groups, access specialists, and historic preservation specialists to determine the most appropriate solution to access problems.

Provide barrier-free access that promotes independence for the disabled person to the highest degree practicable, while preserving significant historic features.

Design new or additional means of access that are compatible with the historic property and its setting.

Not Recommended

Undertaking code-required alterations before identifying those spaces, features, or finishes that are character-defining and must be preserved.

Altering, damaging, or destroying character-defining features in attempting to comply with accessibility requirements.

Making changes to buildings or sites without first seeking expert advice from access specialists and cultural resource professionals.

Providing access modifications that do not reasonably balance independent, safe access and preservation of historic features.

Designing new or additional means of access without considering effects on the historic property and its setting.

Accessibility Considerations

Recommended

Carefully consider proposed changes when planning access that will affect character-defining features, such as porches and entrances, the immediate site, and interior spaces.

Completely survey all deficiencies and potential hazards related to accessibility. Compare the results with a list of highly sensitive and less sensitive historic features to determine where conflicts may occur.

Consider all alternative access possibilities in the context of preservation. In some cases, where compliance with access requirements would threaten or destroy the historic significance of a building or site, the codes permit some options, such as rear or secondary entry access locations, the addition of an elevator, or a lift in place of a ramp.

Not Recommended

Accepting existing access solutions as a standard. Access solutions at the Presidio have frequently had an adverse effect on the historic fabric because of their appearance or the irreversible damage they have caused to historic features, finishes or site elements.

Installing a new internal elevator that penetrates the roof, without first considering the merits of building a compatible new addition to house the elevator.

Modifying stairs and railings; even seemingly minor alterations to these simply designed elements may adversely affect their character-defining qualities. Consult the State Historic Building Code to evaluate compliance and hazards.

Installing a ramp where the main entrance is a single step above the front porch (a common accessibility problem at the Presidio), which may adversely affect the historic fabric. Alternate locations for a compliant entrance should be considered.

The Presidio presents many obstacles to access for the disabled, some due to topography and others due to poor planning and design, as shown here by the unpaved path and exposed drainage culvert.

Only a small number of Presidio buildings have been modified to ensure accessibility. In most cases, as shown above, the solutions do not comply with codes because of slope, railing design, or incomplete access, or the damage to the building's significant historic features.

Accessibility Considerations

Here, both a drinking fountain and a change of floor level at the door prevent an un-obstructed path of travel for the disabled.

Recommended

Develop a plan for compliance, in consultation with the National Park Service and specialists in the fields of accessibility and cultural resource professionals. Following a consistent design methodology, establish a completely accessible path of travel to and throughout the building.

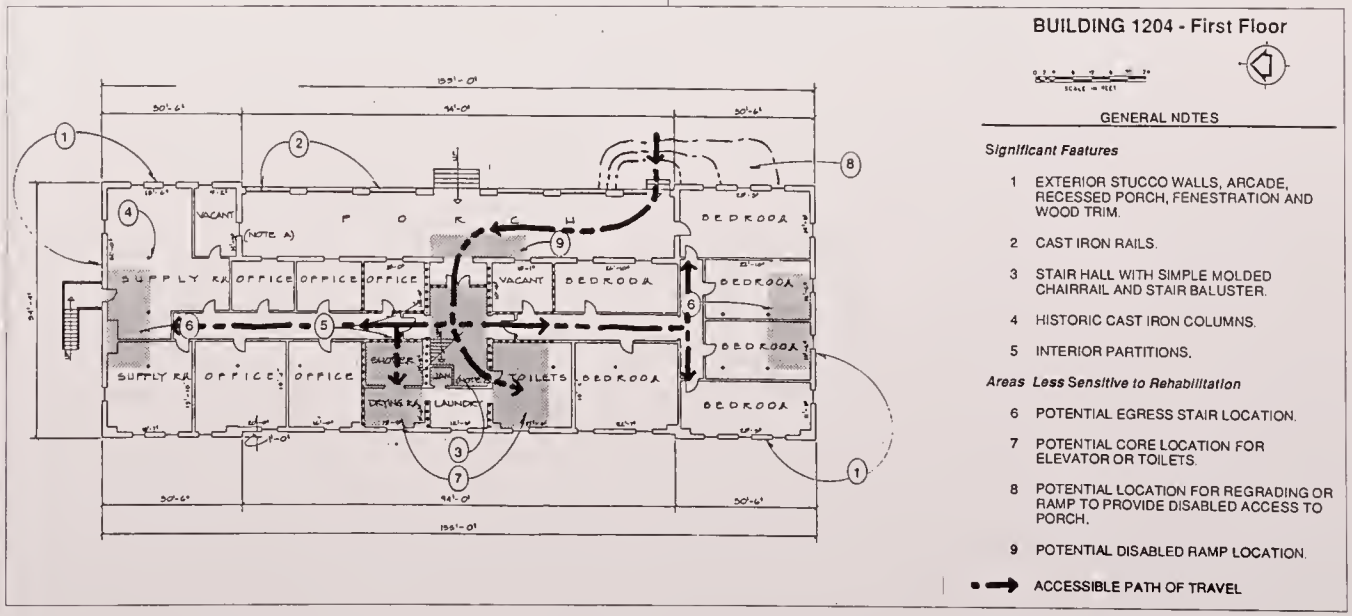
Not Recommended

Providing disabled access through basements or service areas, as in some current solutions at the Presidio. Such points of access should be relocated and redesigned as part of any rehabilitation.

Assuming that the rear facade of a building is less sensitive to change than its nominal front. Some Presidio buildings have several facades with significant features; the addition of a substantial structure to any facade may be unacceptable in such cases.

Minimizing the character-defining importance of utilitarian features, such as loading docks, service entrances, or completely paved sites, when developing access solutions.

Damaging character-defining features in making housing units accessible. Some residences have serious obstacles to access from parking to porch to main floor entrance; others may be more easily reached, but have second floor bathrooms or narrow halls and doors. Few housing units can be modified without affecting character-defining features.



Potential areas for modification to meet access needs must be evaluated in conjunction with preservation concerns.

Accessibility Considerations

Recommended

Establish access for all persons through a primary entrance. In some building uses, it is more important to integrate disabled access into the general public entrance. In all cases, an attempt must be made to allow all persons access to a common arrival point, whether this is a porch, lobby, or other space. Frequently, a secondary entrance can connect internally with the main lobby.

Consider regrading to develop an accessible path from parking to the building only where character-defining features of the site will not be affected.

Take advantage of changing use patterns when they can be adapted to provide a satisfactory access path. Often, the main entrance has shifted from the original front entry to a back or side entry, due to more convenient automobile access. This reorientation may help preserve the building's historic entrance facade. A suitably designed ramp to the back door of an individual residence, for example, may satisfy both needs.

Not Recommended

Replacing or rebuilding all doors throughout.

Reconstructing entire bathrooms when the addition of new facilities is feasible.

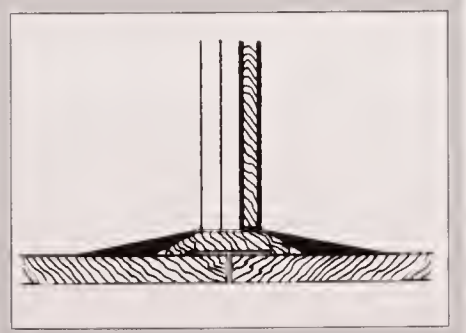
Replacing all hardware.

This residence, though one of the oldest at the Presidio, has features that allow it to be adapted for disabled use—a near grade level entrance, appropriate space for a bedroom and bath on the first floor, and doors and halls of adequate width.

Some utilitarian buildings, such as these warehouses, are equipped with ramps for moving materials. These are not compliant with accessibility standards, but are historic features. New, compliant ramps must be added without destroying the historic character of the building. Where several warehouses are connected by a continuous loading dock, a single compliant ramp may provide access to the entire group.

Accessibility Considerations

Some buildings at the Presidio, such as this residence, have no disabled access to their front doors. The porch may be extended to meet existing grade, using compatible building materials.



An existing wood threshold, which is often an obstacle for the disabled, can be modified with the addition of bevels rather than replaced.

Recommended

Allow for differentiation between the design of access solutions and the existing structure, as discussed in the "New Additions" chapter. However, additions should be of a compatible mass, scale, and detailing. The utilitarian character of many Presidio buildings makes the addition of straightforward access solutions (such as ramps) possible.

Consider future reversibility as a key element in determining whether access solutions are appropriate. Most solutions will affect the historic fabric to some extent, but their effects should be minimized.

Carefully assess the effects of any new exterior addition—whether a small ramp or an elevator tower—on both the building and its setting. Consider limited site regrading to provide access to porches without adding major ramp structures.

Ensure that the major circulation route to every public space within a building is accessible to all. Throughout the Presidio, door thresholds are not accessible, but the addition of bevels to thresholds of modest height may improve access to and within many buildings.

Not Recommended

This important public building, (top right) is currently only partially accessible through a rear office entrance, (shown lower right). By regrading the site from the front porch to an accessible parking area, replacing the nonhistoric front steps (shown above), with a ramp of 5% or less slope, and sensitively modifying the low porch railing, the disabled could more easily reach the building's public spaces.

Recommended

Consider alternative solutions for Presidio interiors with level changes of one to two steps. Often, constructing ramps in these locations may damage significant finishes, door openings, and other historic features. In some cases, functions within a building can be reorganized to allow access to all areas on a single level.

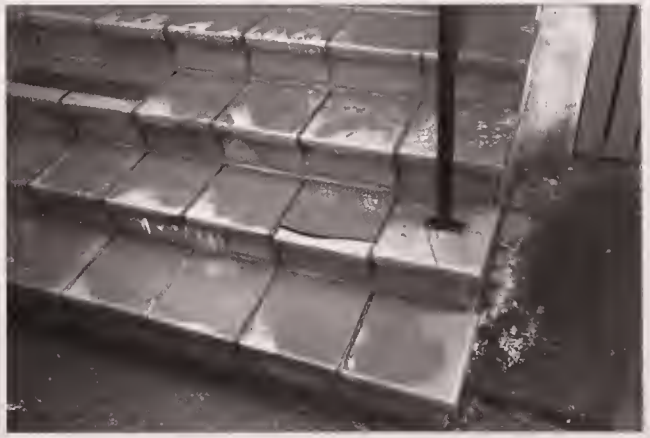
Introduce new facilities such as stairs and toilets into less significant spaces (service areas or repetitive spaces) or spaces that have been previously altered. Knowledge of a building's construction and alteration history is essential in developing access solutions.

Choose previously modified interior spaces as the best candidates for further modification and addition of required facilities for accessibility.

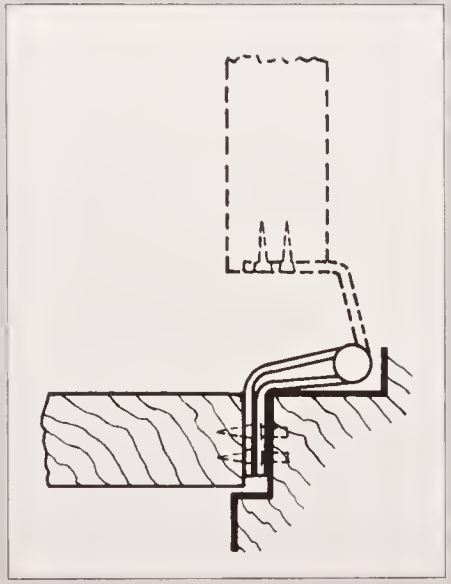
Install reversible treatments for slippery surfaces such as smooth concrete, quarry tile paving, or vinyl tile.

A three-foot change of level prevents entry to the residential unit, upper right, from grade; however, the interior could be successfully modified for use by disabled residents. A wheelchair lift might be appropriate in such a location. Conversely, the unit below right, while easily reached from outside, has narrow halls and doors and numerous character-defining features that preclude its adaptation for disabled occupancy.

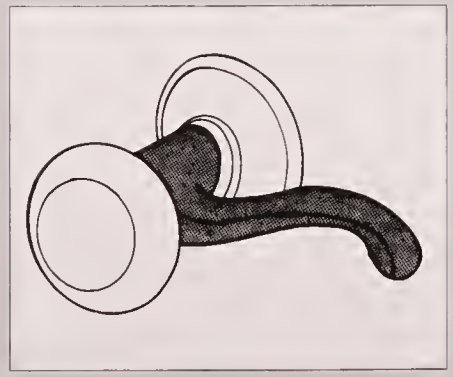
This quarry tile stair has several features that make it hazardous for the disabled—a smooth surface, a railing that stops short of the stair end, and some deterioration. Numerous, less obvious hazards such as this exist in most Presidio buildings.



Accessibility Considerations



Offset hinges can add up to 2 inches to the width of a door opening.



Stylistically appropriate levers can be added to historic door knobs.

Recommended

Consider rehanging doors with offset hinges where door opening width is inadequate.

Retain historic doors wherever possible. Where doors must be removed, retain jamb and casing as a framed opening rather than removing the entire assembly.

Consider adding lever hardware rather than replacing significant hardware.

Preserve significant fixtures and finishes within existing toilet rooms while upgrading the facility for accessibility. In some cases, the addition of completely new facilities for the disabled may be preferable to remodeling.

Select accessible hardware where required, such as for drinking fountains, telephones, and signage, that are compatible with the historic character and features of a building.

Establish a clear interior and exterior guidance system for visually and physically impaired persons. Many Presidio buildings are similar in structure and appearance, and have large and disorienting interiors.

Access from these residences to the street and to garages is prevented by the change in grade. Regrading the lower-level lawn and adding a sloped walk or ramp would destroy the historic grading of the site and circulation features. Other less destructive solutions should be sought.

A common condition at the Presidio—the one- or two-step elevation of the first floor above grade level, as shown here—could in some cases be treated by regrading and constructing a sloped sidewalk, which is preferred to a ramp because of its reduced effect on the historic appearance of the building.

Health and Safety

In rehabilitating historic buildings, it is necessary to consider the impact of meeting current health and safety codes (e.g., public health, occupational health, life safety, fire safety, electrical, and structural and building codes) on character-defining spaces, features, and finishes. The National Park Service has authority over construction and alteration of buildings and sites at the Presidio. Special coordination with the responsible code officials at the state, county, or municipal level may also be required. Building permits and occupancy licenses will be required and coordination with the National Park Service early in rehabilitation planning is recommended.

In the area of occupational health, research on older, more commonly used building materials (e.g., insulation, floor and wall coverings, and lead-containing paints) indicates that the presence of toxic substances is potentially hazardous to building occupants. Following careful investigation and analysis, some form of abatement may be required, such as encapsulation, or partial or total removal. All workers involved in the encapsulation, repair, or removal of known toxic materials should be adequately trained and wear proper personal protective equipment. Preventive and routine maintenance programs, to include proper warnings and precautions, should be developed for historic structures known to contain such materials.

Conversion of the Presidio from military post to national park will require rehabilitating many buildings to accommodate new uses. Many Presidio buildings were not built to civilian codes and must be upgraded to meet the minimum life safety standards required for existing buildings. Many buildings may also need more substantial modification to meet current code requirements for proposed new uses.

As Presidio buildings are rehabilitated, National Park Service policy requires that they be brought to a level of safety and compliance consistent with current nationally accepted model building codes as mandated by federal law. The Presidio will comply with the codes and standards listed below:

- Americans With Disabilities Act (ADA).
- Uniform Federal Accessibility Standards (UFAS).
- National Fire Protection Association (NFPA) - 101 Life Safety Code.
- Uniform Code for Building Conservation (UCBC).
- Uniform Building Code (UBC) for new work.
- National Electric Code (NEC) for new work.
- Uniform Mechanical Code (UMC) for new work.
- Uniform Plumbing Code (UPC) for new work.

Health and Safety

The California State Historic Building Code (SHBC) and the California Building Standards Code (CCR - Title 24) should also be considered.

Most building codes were written with new construction in mind. In the case of historic buildings, full compliance with codes would result in extensive destruction of significant features. The UCBC and the SHBC provide alternative building regulations and standards for buildings designated as historic structures. The SHBC meets the intent of the applicable codes by mandating an equivalent level of safety, but allows more flexibility in achieving it. Creatively applied, the SHBC can preserve the integrity of historic buildings. The National Park Service retains authority for all project review and compliance issues, including code interpretation and enforcement of Section 106 compliance (Section 106 is part of the 1966 Historic Preservation Act, which requires every federal agency to consider how each of its undertakings will affect historic properties).

Fire safety is a major concern at the Presidio. The fire safety elements of the current code are based on occupancy (the function of a building and number of people in it), construction type (fire-resistant characteristics), and proximity of a building to adjacent structures. Its purpose is to ensure sufficient time for protected exiting during a fire or other emergency. Presidio buildings generally have the following characteristics related to fire safety:

- Most Presidio buildings are well built of permanent materials and are generally sited with some clear space around the exterior.
- All Presidio buildings are consistently deficient in some code requirements. Many buildings have an insufficient number of exits; a single unenclosed stair is frequently the only interior exit from upper floors.
- Exterior-mounted metal or wood fire escapes may provide a second means of egress, but travel distances could be excessive to legal exits.
- Exit routes do not always lead directly to the exterior and rarely lead to the roof. In addition, dead-end corridors are existing hazards.
- Although sprinkler systems have been added to some buildings, they are generally quite old and unreliable.
- Many Presidio buildings are also deficient in detailed code requirements, such as stair riser-to-tread ratios, excessive stair length, stair winders, landings, and handrails and guardrails.

Some Presidio buildings were built as temporary structures. These may have significant code deficiencies, including noncompliant fire exits.

Health and Safety

Several safety issues are illustrated above—pipe insulation may contain asbestos, pipes block access to the fire exit, and the exit is noncompliant.

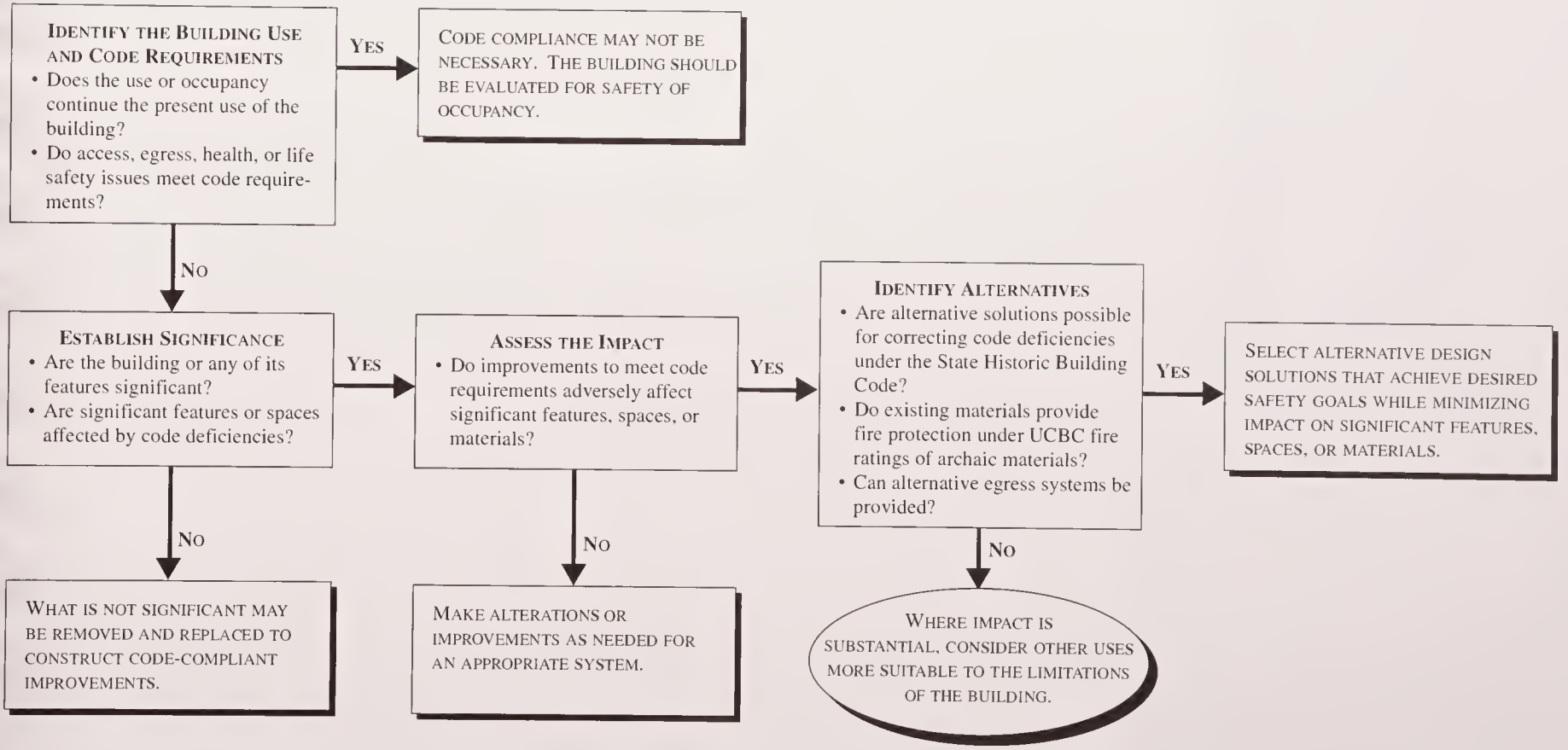
Hazardous materials—particularly asbestos and lead-containing paint—may be present in many Presidio buildings. The Army is responsible for any necessary abatement prior to vacating the post and has recently surveyed many Presidio buildings to identify asbestos-containing materials. Abatement may have been accomplished by either removal or encapsulation. If encapsulated, hazardous material continues to pose a threat; it may become airborne if disturbed during construction projects or as the protective wrapping deteriorates.

Lead was a common ingredient in paint mixtures until the 1950s, and it is likely that any Presidio building will have lead-containing layers under its current coat. The National Park Service has an obligation to inform occupants and maintenance workers of potential hazards and to ensure that they are not exposed to undue risks—especially children under the age of six, who are particularly susceptible to lead poisoning. This involves eliminating lead poisoning hazards (including lead pipes as well as lead-containing paints) for occupants of all buildings owned by the National Park Service. However, removing paint by stripping the old coats poses serious health and safety concerns. It also eliminates what may be the only record of past decorative treatments and alterations. Paint should not be removed if a painted surface is intact and it is determined that the presence of lead-containing paint presents no health danger to building occupants.

Protecting a usable building from destruction by fire is a sustainable practice; it maintains the building, avoids fire-related air pollution, and avoids the generation of debris. The use of automatic fire suppression systems not only enhances life safety, but also offers protection to the building and its contents.

From a sustainable design viewpoint, the need to remove and properly dispose of toxic materials—such as asbestos-containing materials, lead-containing paints, and lead water supply pipes—must be balanced with the need to preserve and conserve the existing built resource. If a feature must be modified to meet code, additive methods rather than wholesale replacement should be used to preserve the historic resource.

Seismic safety, accessibility, and mechanical and electrical codes are addressed in separate chapters of these guidelines.


IDENTIFY THE BUILDING USE AND CODE REQUIREMENTS
• Does the use or occupancy continue the present use of the building?
• Do access, egress, health, or life safety issues meet code requirements?
YES
CODE COMPLIANCE MAY NOT BE NECESSARY. THE BUILDING SHOULD BE EVALUATED FOR SAFETY OF OCCUPANCY.
NO
ESTABLISH SIGNIFICANCE
• Are the building or any of its features significant?
• Are significant features or spaces affected by code deficiencies?
YES
ASSESS THE IMPACT
• Do improvements to meet code requirements adversely affect significant features, spaces, or materials?
YES
IDENTIFY ALTERNATIVES
• Are alternative solutions possible for correcting code deficiencies under the State Historic Building Code?
• Do existing materials provide fire protection under UCBC fire ratings of archaic materials?
• Can alternative egress systems be provided?
YES
SELECT ALTERNATIVE DESIGN SOLUTIONS THAT ACHIEVE DESIRED SAFETY GOALS WHILE MINIMIZING IMPACT ON SIGNIFICANT FEATURES, SPACES, OR MATERIALS.
NO
WHAT IS NOT SIGNIFICANT MAY BE REMOVED AND REPLACED TO CONSTRUCT CODE-COMPLIANT IMPROVEMENTS.
NO
MAKE ALTERATIONS OR IMPROVEMENTS AS NEEDED FOR AN APPROPRIATE SYSTEM.
NO
WHERE IMPACT IS SUBSTANTIAL, CONSIDER OTHER USES MORE SUITABLE TO THE LIMITATIONS OF THE BUILDING.

Health and Safety

Each building has its own particular health and safety issues. A spiral staircase, for example, is not an acceptable exit.

Recommended

General Considerations

Identify the historic building's character-defining spaces, features, and finishes so that code-required work will not result in their damage or loss.

Comply with health and safety codes, including seismic code requirements, in such a manner as to preserve character-defining spaces, features, and finishes.

Work with jurisdictional authorities to investigate systems, methods, or devices of equivalent or superior effectiveness and safety to those prescribed by code to avoid unnecessary alterations.

Assess the building, the site, zones within the building, and individual features for fire and life safety. Incorporate this survey into an assessment of the building's historically significant features.

Minimize necessary alterations to the original building through careful planning for reuse. Code requirements may make some reuse proposals impractical.

Not Recommended

Undertaking code-required alterations to a building or site before identifying those spaces, features, or finishes that are character-defining and must be preserved.

Altering, damaging, or destroying character-defining spaces, features, or finishes while modifying a building or site to comply with safety codes.

Making changes to historic buildings without first exploring equivalent health and safety systems, methods, or devices that may be less damaging to historic spaces, features, or finishes.

Permanently altering the appearance of historic walls, ceilings, and floor construction, or removing significant existing historic building fabric to accommodate passive fire suppression.

Recommended

Modify the proposed building use and programs to control hazards and minimize required alterations.

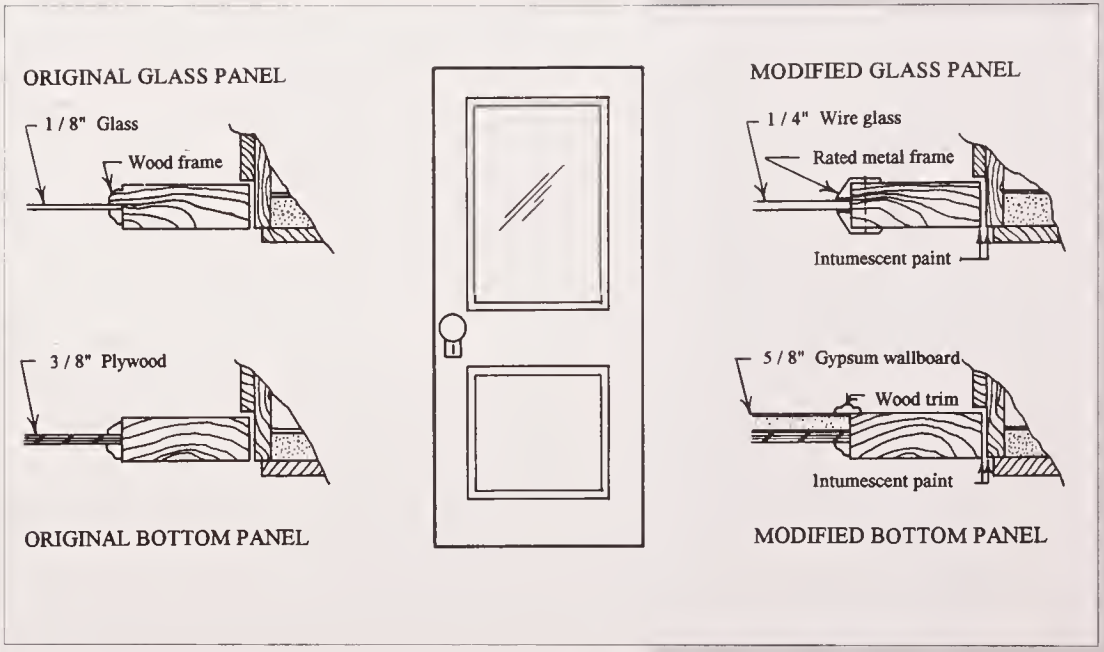
Develop a fire protection master plan report that clearly defines the code requirements and intent, explains the building's deficiencies, and offers equivalent approaches to correct deficiencies with minimal loss of historically significant features.

Doors

Add electromagnetic self-closing devices to doors in high traffic locations where a closed fire-resistant door would interfere with the historic character of the space.

Consider installing automatic fire sprinklers on both sides of a door as a means of protecting historic doors.

Create required fire-resistant assemblies by constructing new fire-resistant doors that leave historic elements intact, as in the following examples:



Sections through original top and bottom panels are detailed on the left. To increase the original fire-resistive capacity, the original glass is replaced in the top panel with 1/4-inch wire glass, and a metal frame (top right) and gypsum wallboard are placed in the lower panel (bottom right). Intumescent paint is applied throughout to both sides of the door and frame.

Health and Safety

Open stairways that do not separate the exit route from other areas of a building create common compliance problems at the Presidio. Stairways may also be considered deficient based on their riser-to-tread ratio, railing height, winders, or nonfireproof materials. Actual risk should be determined using the SHBC. Consider alternative means to meet fire and life safety codes, such as constructing new stairs at another location.

Recommended	Not Recommended
• Modify existing doors to increase fire-resisting capacity by adding fireproof panels, new seals, and panic hardware. Intumescent paint applied to the frame and edges of a historic door will expand when exposed to intense heat, forming an effective seal. • Modify inward swinging doors in exit routes by reversing the direction of door swings.	
Stairs Upgrade historic stairways and elevators to meet health and safety codes in a manner that ensures their preservation (i.e., so that they are not damaged or obscured).	Damaging or obscuring historic stairways and elevators or altering adjacent spaces to meet code requirements.
Add a new stairway or elevator to meet health and safety codes in a manner that preserves adjacent character-defining features and spaces.	Radically changing, damaging, or destroying character-defining spaces, features, or finishes when adding a new code-required stairway or elevator.
Place a code-required stairway or elevator that cannot be accommodated within the historic building in a new exterior addition. The addition should be on an inconspicuous elevation.	Constructing a new addition to accommodate code-required stairs and elevators on character-defining elevations highly visible from the street; or where it obscures, damages, or destroys character-defining features.
Enclose historically open stairs only as a last resort, with glazed partitions or sensitively designed walls and doors. If new interior exiting stairs must be built, locate them in secondary or repetitive space.	

Recommended

Use the SHBC to determine the real risk where the stair riser-to-tread ratio is deficient, resulting in stairs that are too steep, or where stairs include winders. Consider alternative methods of code compliance if necessary, such as constructing new stairs at another location.

Consider adding a ramp and landing that do not damage the historic character or materials at single risers at doors or in corridors to facilitate emergency egress and disabled access.

Evaluate the deficiency of handrails on stairs and guardrails on raised porches and landings using the SHBC. These are generally deficient in height and size of openings and, in some cases, are missing entirely. An existing rail may be adequate for safety, and handrail extensions may not be necessary. In general, do not completely rebuild a feature if it must be modified; instead, use additive methods to preserve the historic fabric.

Remove intrusive elements, such as fire escapes on primary facades, and replace them with more appropriate means of egress.

Not Recommended

Completely enclosing a historically significant open stair without considering alternate means of satisfying fundamental exiting requirements.

Removing or damaging character-defining details of stairs. Reversible, additive solutions are preferred.

Exterior-mounted metal or wooden fire escapes are often the second means of egress from multistory Presidio buildings. Previously approved fire escapes that are structurally safe may be acceptable as one of the required means of egress in some occupancies under the SHBC. If they are intrusive elements on a primary facade, consider replacing them with more appropriate means of egress, such as interior stairs in nonsignificant service spaces.

Health and Safety

A number of buildings at the Presidio have double-loaded corridors with transom windows. These can be modified to increase their fire-resisting capacity by replacing plain glass with approved or listed wire glass, or liquid-filled double-pane lights (visually preferable); or, if necessary, by adding a fireproof panel on the less significant or less visible side of the transom frame.

Recommended

Assemblies

Apply fire-retardant coatings, such as intumescent paints, which expand during fire to add thermal protection to steel.

Upgrade existing materials and assemblies rather than replace them wholesale.

Add fire-resistant partitions to decrease the fire area in nonsignificant spaces.

Apply an additional layer of a fire-resistant material to augment the fire-resistance of wall, ceiling, and floor assemblies. Often one side of an assembly will be more significant than the other; apply fire-resistant materials to the less significant side.

Inspect and repair the fireproof cover of each structural element. Parts of covers may have been removed during the rehabilitation process to allow for placement of pipes, ducts, or conduits, reducing their fire resistance.

Add exit illumination and exit route guidance in a manner that does not damage the historic details and materials.

Not Recommended

Covering character-defining wood features with fire-resistant sheathing that alters their appearance.

Using fire-retardant coatings if they damage or obscure character-defining features.

Adding new fire-resistive finishes in industrial spaces, such as warehouses, where the new finishes alter the original rough-sawn wood interior.

Recommended

Fire Protection Systems

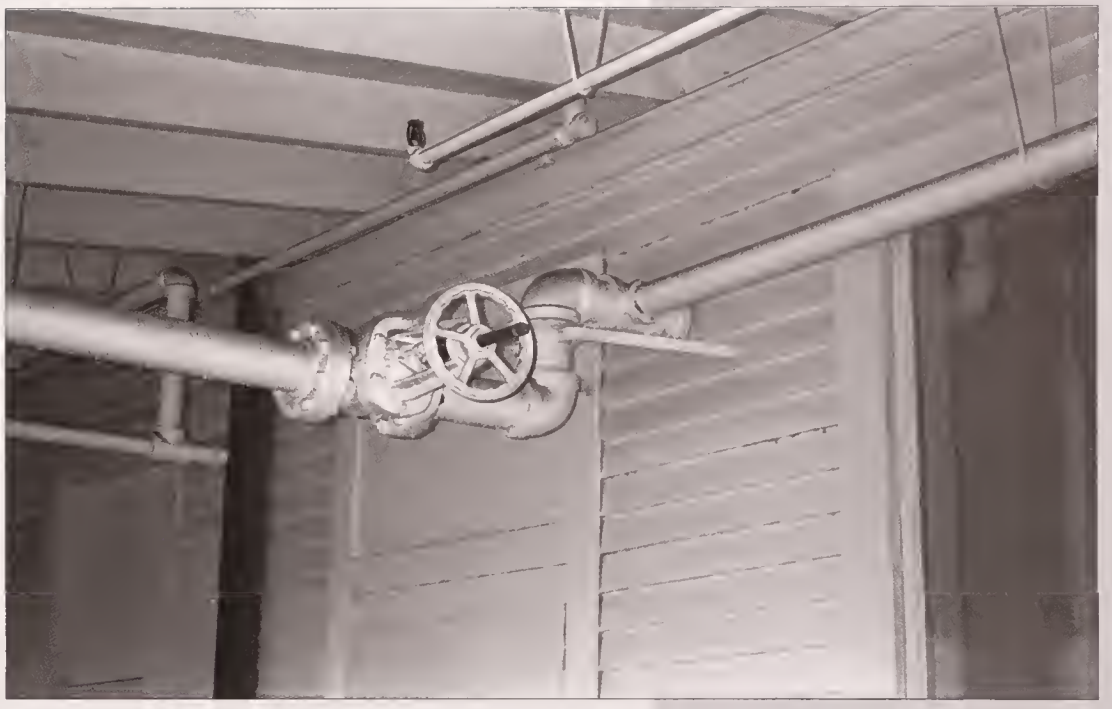
Install sensitively designed fire suppression systems, such as sprinkler systems so that historic features and finishes are retained.

Install active fire protection systems—including automatic interior or exterior fire suppression (sprinklers), fire detection, and automatic smoke management systems—as a means of meeting the intent of the life safety codes while offsetting the need for more destructive upgrading of stairways, corridors, and doorways.

Ensure that automatic fire sprinkler protection, where required for life safety or protection of property, is installed with minimal disturbance and damage to the historic fabric.

Conceal sprinkler piping when possible, except in some utilitarian structures where exposed piping may be more appropriate.

Minimize visual intrusion where sprinkler piping must be exposed by planning piping routes and sprinkler head locations; for example, sprinkler heads may be designed to complement an existing decorative ceiling motif or to coordinate with existing grids or patterns.



Where automatic fire sprinkler protection is required for life safety or protection of property, careful planning is necessary to minimize disturbance and damage to the historic fabric. The pipes shown above were installed without regard for the historic fabric.

Health and Safety

Mounting the exit sign shown above required drilling holes through a historic pressed metal ceiling. Exit signage should clearly delineate the exit path, but the choice and placement of components should not damage historic finishes.

Recommended

Choose appropriate sprinkler head types and styles that have the least effect on the visual integrity of the building.

Paint sprinkler piping to match existing ceilings and walls. Sprinkler heads should not be painted because paint would alter the factory finish and jeopardize proper function.

Select a fire extinguisher cabinet style that is least obtrusive to the surrounding historic fabric. Use recess-mounted fire extinguisher cabinets where possible, but only where they would not alter the significant historic fabric, such as wainscoting.

Install smoke and heat detectors so that they are not visually prominent and do not affect the significant historic fabric of the building.

Hazardous Materials

Remove toxic building materials only after thorough testing and only after less invasive abatement methods have been shown to be inadequate.

Not Recommended

Altering historic interior features and finishes without careful testing and without considering less invasive abatement methods.

Removing unhealthful building materials without regard to personal and environmental safety.

Recommended

Provide workers with appropriate personal protective equipment for hazards found at the work site.

Monitor encapsulated asbestos for any signs of deterioration. If necessary, have hazardous material removed by trained personnel following prescribed methods.

Determine whether lead paint layers need to be removed. National Park Service policy requires the removal of all lead-containing paint from housing units. However, in other building uses, if the surface is intact and the presence of lead-containing paint presents no health dangers to building occupants, the existing paint can be overpainted.

Monitor housekeeping practices to minimize the build-up of lead dust.

Both lead-containing paint and asbestos-containing insulation are problems in many Presidio buildings. Their location and condition will determine the appropriate treatment.

Glossary

Arcade

Balustrade

This glossary is designed to facilitate understanding of the terms in this document. However, the entries are not intended to be a comprehensive list of architectural and construction terms and the definitions are not exhaustive, as they explain the meaning of the terms specifically for the Presidio. Professional and technical dictionaries should be referenced for more information and for additional uses of terms.

Abatement - removal or lessening of hazard, e.g., of asbestos

Adaptive Use - the process of making a building viable, often involving sensitive adjustment of an existing structure to new needs

Aggregate - a granular material (e.g., sand or gravel) which, mixed together with water and a cementing agent (binder), forms concrete, mortar, or stucco

Ambient Lighting - the general overall lighting in a space, as opposed to **task lighting** (focused lighting for a specific task)

Arcade - a series of arches on columns or piers, either freestanding or attached to a wall; also a covered walk with a line of such arches on one or both sides; see illustration

Architrave - see illustration at **Classical Orders**

Ashlar - squared and dressed stones used for facing a masonry wall

Backsplash - a panel protecting the wall behind a sink or counter

Baluster - one of a series of small pillars or units of a balustrade; also an upright support of the railing for a stair; balusters can often be decoratively sawn; see illustration this page and at **Stair**

Balustrade - a railing or parapet consisting of a top rail on balusters, sometimes on a base member and sometimes interrupted by posts; see illustration

Base (Baseboard) - a horizontal decorative element along the lowest portion of an interior wall covering the joint between the flooring and the wall; also the lowest component of a column; see illustrations at **Classical Orders** and **Wall**

Bay - a regularly repeated spatial unit of a building or wall as defined by columns, piers or other vertical elements; also a structural projection, most often with windows, expressed on the elevation of a building

Beam - a horizontal structural member, bridging between its supports and carrying the weight of a floor or roof above; see illustration at **Structural System**

Belt (Belt Course) - a horizontal band course on a brick or stone wall; it may be of a different kind of brick or stone; see illustration at **Facade**

Biological Growth - black, brown, or green discoloration due to the presence of lower plant forms such as moss and fungi

Bituminous - composed of or containing bitumen materials, such as tar, asphalt, macadam, or asphalt cement

Bollard - a low post, usually made of stone, placed alone or in a series to prevent vehicles from entering an area

Bond - the arrangement of bricks or stones in a wall created by lapping them upon one another so that the vertical joints are staggered; bond patterns seen at the Presidio include Common and Flemish; see illustrations on this page and page 30

Bonding Agent - a substance applied to create adhesion between two materials, such as that applied to a substrate before installation of a finish coating

Bracket - a projection from a vertical surface providing support under cornices, balconies, window frames, etc.; see illustration; also sometimes used to describe a metal fastener

Came - a slender rod of cast lead used to hold together the panes or pieces of glass in casements and stained-glass windows

Capital - see illustration at **Classical Orders**

Casement Window - a window having a sash with hinges on one side allowing it to open vertically into or out of a space

Casework - interior built-in cabinets and shelving

Casing - the trim molding around a door or a window; see illustration at **Double-Hung Window**

Cast Stone - an artificial building stone manufactured from concrete, cast in a mold and used as paving, facing, or ornament. Pigments and aggregate are often added to simulate the appearance and color of natural stone.

Caulking (calking) - a resilient mastic compound used to seal cracks, fill joints, and provide weatherproofing

Cementitious - of plastic consistency when applied, with cementing or binding properties; also, cement-containing

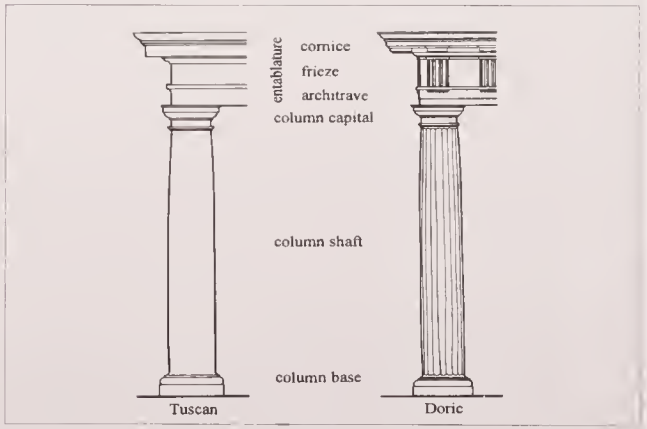
Chair Rail - a horizontal wood strip or molding on the wall of a room at the height of a chair back, preventing damage to a plaster wall, used alone or applied to the top of wainscoting; see illustration at **Wall**

Character-Defining - essential to the perception or understanding; a character-defining element is a feature that contributes to the special quality of a building or a site, without which the uniqueness is lost

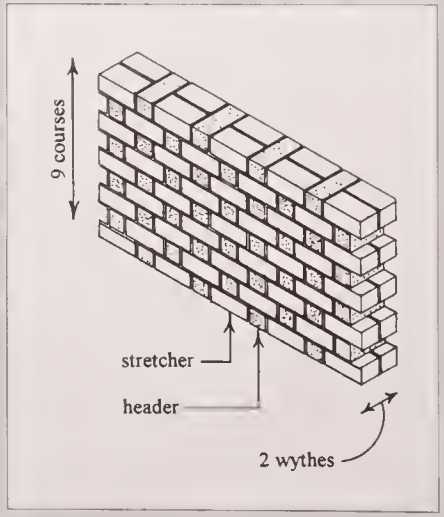
Cladding - the exterior wall covering of boards over a wood or steel frame; siding; types found at the Presidio include drop and lapped siding, board and batten, shingles and tongue and groove; see illustrations on pages 66 and 67

Classical Orders - strict established principles of style and design for columns and entablature derived from classical Greece and Rome; most commonly found at the Presidio are varying interpretations of Greek **Doric** and Roman **Tuscan** orders; see illustration below

Clear-Span - in an interior, an uninterrupted distance between the end supports of beams spanning the space



Bracket



Bond

Glossary

Colonnade

Colonial Revival

Colonial / Georgian Revival

Clerestory - an elevated range of windows in a wall that rises above adjacent roofs; see illustration at **Window Types**

Colonnade - a row of columns supporting a beam or entablature; see illustration

Colonial Revival - a style popular in the mid-19th and early 20th centuries that used 18th-century Georgian and Federal elements to romantically recall America's earlier Colonial period. Colonial Revival refers to many buildings constructed at the Presidio from 1895 until circa 1920. They are characterized by rectangular, symmetrically composed volumes with gabled, hipped, or gambrel roofs, external porches, decorative brackets or shaped rafter ends; wood or brick classical details; and lunettes, roundels, Palladian, or other window forms in gable ends

Colonial/Georgian Revival - a more specific variation of Colonial Revival, constructed at the Presidio from circa 1910 through 1940s. Typical features include higher pitched hipped roofs, classically detailed porches and dormers, doors with fans, and sidelights. The preferred materials were brick with white-painted wood trim. Some show a Mediterranean influence with red tile roofs

Column - see illustrations at **Classical Orders, Pier,** and **Structural System**

Common Bond - see illustration on page 30

Composition Shingle - manufactured, asphalt-saturated felt shingle used as roofing after 1900

Compression - a force that tends to shorten or crush a member; the opposite of **tension**

Conduit - a tube or trough for receiving and protecting electric wiring; also a pipe or channel for conducting water

Conservation - practice encompassing technical examination, preservation, protection, and maintenance of tangible cultural resources

Consolidation - chemical treatment that improves the cohesion of a material, used in the conservation of masonry, wood, concrete, and stucco

Construction Type - a term used to describe a code-imposed classification of a building, based on the degree of public safety and resistance to fire a building can provide

Coping - a linear cap protecting the wall below it by shedding water away from it

Corbel - an upward stepped projection in the face of the wall used to support a weight above, see illustration on page 30

Cornice - in classical vocabulary, the top portion of the entablature; see illustration at **Classical Orders**; also an ornamental projection finishing off an element, such as at the top of a wall below a roof

Course - in masonry, a horizontal row of units, running the length and spanning the thickness of the wall; see illustration at **Bond**

Cresting - an ornament of a roof, roofscreen, or wall; generally rhythmic, highly decorative, and frequently perforated

Cupola - a small dome; a small structure built on top of a roof

Cyclical Maintenance - regularly scheduled cleaning, inspection, maintenance and repair of a building, ranging from daily to long-range tasks

Damper - a device for regulating the flow of air in the flue of a furnace or chimney

Deflection - the deformation of a structural member as a result of loads acting on it.

Delamination - deterioration, as in plaster, manifested by the separation of layers

Dentils - small rectangular toothlike blocks arranged in a row to form a decorative band; see illustration

Diaphragm - a continuous structural plate providing rigidity and strength in all directions

Displacement - the action of being forced out of an original, usual, or proper position

Dormer - a projecting structure on a sloping roof, usually perpendicular to the ridge of the main roof, with its own roof and a window on its front vertical face; see illustration on next page

Double-Glazed Window - a window having two sheets of glass with an air space between, used to improve thermal or acoustic properties

Double-Hung Window - a window containing two moveable sash sections that open vertically; see illustration

Downspout - a vertical sheet metal or plastic tube on the exterior of a building conducting water from the roof; (frequently used interchangeably with **leader**); see illustration at **Gutter**

Drip Groove - a groove or indentation designed to direct rain water from a masonry structure

Ductwork - part of heating, ventilation, and air-conditioning system: a conveyance system of ducts used to transfer air from one location to another, often fabricated of sheet metal

Dutchman - a small piece or wedge inserted to fill an opening; see illustrations on pages 39 and 72

Eave - the overhanging portion of a sloping roof projecting beyond the wall below; see illustration at **Wall**

Efflorescence - a deposition of soluble salts originating in the masonry or adjacent materials on the surface of a wall; usually initiated by excessive moisture penetration; see photograph on page 39

Egress - a path of exit; in case of emergency, an uninterrupted path of travel from any point in the building to safety (exterior at ground level)

Electrolyte - an electric conductor, such as water or moisture

Encapsulation - containment and enclosure in a way that prevents dangerous exposure; one means of treating asbestos within a building

Entablature - see illustration at **Classical Orders**

Epoxy - synthetic resin used chiefly as an adhesive or in coatings; also used to consolidate wood

Escutcheon - a protective plate or flange over an opening

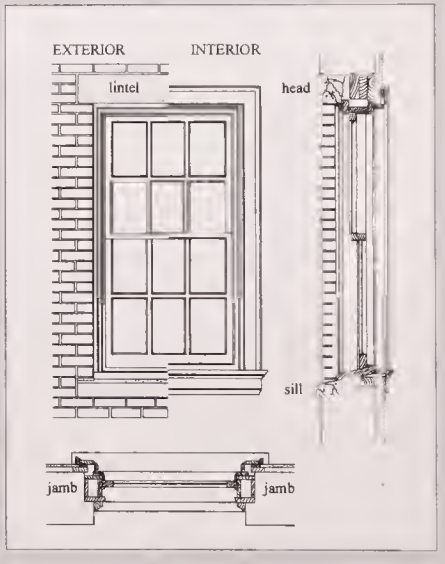
Fabric - the elements and materials of which a building is made

Facade - the entire exterior elevation of a building, particularly the front; see illustration

Federal Style - see **Colonial Revival**

Fenestration - the arrangement or pattern of windows or other openings in the facade of a building.

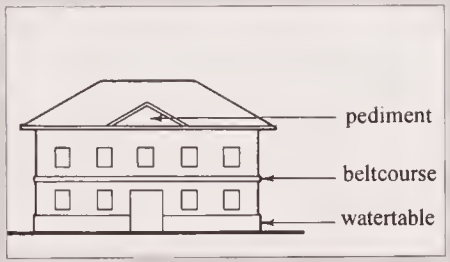
Dentils



Double-Hung Window

Glossary

Dormer



Facade

Scrolled Gable

Finial - an ornament, usually pointed, which terminates a vertical element

Fire-Rated (Fire-Resistance-Rated) - classified, in accordance with established standards and tests, to withstand or confine fire without loss of structural function (measured in length of time)

Flashing - a thin impervious sheet of metal or plastic used in construction to prevent water penetration and to redirect water; see illustration at **Wall**

Flemish Bond - see illustration on page 30

Flue - a heat-resistant enclosed passage, as a chimney or pipe, carrying the smoke from a fireplace, boiler, or furnace to the outside

Formwork - a temporary construction to contain wet concrete in the required shape while it sets

Frieze - see illustration at **Classical Orders**

Furring - attaching wood or metal spacers between a subsurface and a finish surface, e.g., between masonry wall and plaster

Gable - the triangular section of a wall below a two-way pitched roof, sometimes projecting above the roof; a decorative **scrolled gable** is often found on Mission Revival buildings; see illustration

Gabled Roof - see illustration at **Roof Types**

Galvanic Corrosion - accelerated corrosive action occurring when two dissimilar metals touch each other while wet with any solution, such as water, capable of conducting an electrical current; this process tends to accelerate corrosion of one metal while protecting the other

Galvanized - coated with zinc to prevent corrosion; applied to iron, steel, or aluminum

Gambrel Roof - see illustration at **Roof Type**

Georgian Revival - see **Colonial Revival**

Girder - a principal horizontal structural member supporting beams or rafters; see illustration at **Structural System**

Greek Revival - refers to the style that applied the classic Greek temple form to institutional, civic, and residential architecture. Many of the earliest extant Presidio buildings, dating from the 1860s to 1880s were designed in this style. The buildings are characterized by rectangular, gable roofs with a horizontal emphasis. Features include boxed cornices, raking cornices on gable ends, a simplified entablature, molded window heads and classically detailed raised porches.

Grout - mortar that is sufficiently liquid that it can be poured or pumped into joints or cavities in masonry.

Guardrail - a railing or a protective barricade providing safety at an elevated walking surface, such as a raised terrace, roof edge, or stair landing open to the space below.

Gutter - a channel at the bottom edge of a roof for collecting and carrying rainwater; see illustration.

Handrail - a hand support: a single rail along a stairway or a ramp; see illustration at **Stair.**

Head - the top horizontal member of a door or window frame; see illustration at **Double-Hung Window**

Header - see illustration at **Bond**

Hipped Roof - see illustration at **Roof Types**

Historic Character - the sum of all visual aspects, features, materials and spaces associated with a property's history

Historic District - an ensemble of buildings and their surroundings given a designation due to their significance as a whole

Historic Structure Report (HSR) - a document based on research and fieldwork which evaluates and presents the history and condition of a structure and its setting, and makes recommendations for treatment consistent with its significance, integrity, and condition; the document may include schematic designs for the programmed use

Hood Mold - a projecting molding over the head of a door or window; see illustration

In Kind - matched exactly in material, form and installation

Insulating Glass - double glazing in which the airspace between the sheets of glass is hermetically sealed

Integrity - the quality or state of being complete, uncompromised and whole; **historic integrity** is the extent to which the original features of a building remain unchanged

Intumescent Paint or Coating - paint or coating that swells when exposed to heat

Italian Renaissance Revival - see **Mediterranean Revival**

Italianate Style - refers to the style that was inspired by Italian Renaissance architecture. This style was popular during the Civil War and the Italianate buildings at the Presidio appeared around 1860 to 1880. Roofs are most often hipped, the exterior has wood channel siding, and porches have Tuscan columns.

Jamb - a vertical structural member at the side of a door or window frame; see illustration at **Double-Hung Window**

Joist - one of a series of parallel beams used to support floors or ceilings, supported in turn by beams, girders, or walls; see illustration at **Structural System**

Knee Wall - a wall supporting roof rafters at an intermediate point in their span

Landing - the horizontal platform at the end of a stair or a ramp, or between flights, see illustration at **Stair**

Lateral Support - the bracing of a wall or a structural member to strengthen against a load acting from the side, as in the case of wind or earthquake loads

Leader - a rainwater conduit made of steel pipe or tubing, on the building exterior or within an exterior wall (sometimes used interchangeably with **downspout**)

Lintel - a horizontal structural member over a window or a door carrying the weight of the wall above; see illustration at **Double-Hung Window**

Light (Lite) - an individual piece of glass often joined within a window sash with similarly sized pieces separated by muntins; = **pane**; see illustration at **Double-Hung Window;** sidelight is usually a long fixed sash located beside a door or window—often in pairs; six-over-six refers to six panes above and six below; see illustration at **Window Types**

Greek Revival

Gutter and Downspout

Hood Mold

Glossary

Loggia

Italianate Style

Mediterranean Revival

Mission Revival

Load-Bearing - capable of supporting a load in addition to its own weight

Loggia - a covered arcade or gallery, usually within the body of the building at second floor level or above, with one side open to the air; see illustration

Louver - an assembly of horizontal slats used to regulate the amount of air or light admitted into a space; see illustration at **Monitor**

Low-E Glass - glass with low emissivity, i.e., having qualities that arrest transfer of solar heat gain through the glass pane

Lunette - see illustration at **Window Types**

Mastic - a heavy-bodied, dough-like adhesive; may be waterproof and somewhat elastic

Massing - arrangement of geometric volumes into a building's shape

Mediterranean Revival - this style springs from the shape and mass of large Italian villas; constructed at the Presidio primarily from 1910 through the 1940s, these buildings are stylistically similar to the Mission Revival, with simple volumetric forms and plain, light-colored stucco or concrete surfaces. They have red tile roofs and undecorated openings.

Microclimate - a set of predictable weather conditions specific to a certain locale

Mission Revival - a popular style first seen at the Presidio around the turn of the 20th century; it was based on the shape and form of Spanish missions. Typically, these buildings have a rectangular form and a gabled roof with scrolled or stepped gable ends. A ground floor arcade, often extending beyond the building, is a common feature, as are stuccoed wood or concrete walls; red tile roofing; unornamented round-arched openings; and quatrefoil or other shaped windows in gable ends

Mitigation - alleviation of an adverse condition

Modillion - a scrolled ornamental bracket placed horizontally below a cornice

Molding - a contoured decorative band applied to a wall surface or to the edge of a building element; often functioning to cover a joint between materials or elements; see illustration at **Wall**

Monitor - a raised structure on a roof with louvers or windows admitting air or light; frequently found on large utilitarian buildings; see illustration

Mullion - major support member found between adjacent window sash or panels of glass; see illustration at **Double-Hung Window**

Muntin - small bar separating and holding individual glass panes within a window sash; also found on glazed, multi-paned doors; see illustration at **Double-Hung Window**

National Historic Landmark - a building or a site legally designated as having national significance

National Register of Historic Places - a list maintained and revised by the Secretary of the Interior of properties (buildings, sites, districts, and objects) designated as landmarks due to local, state, or national significance

Newel Post - an ornamental post at the beginning or end of a stair handrail; see illustration at **Stair**

Occupancy - the existing or intended use of a building (as well as the number of people occupying it) as in code definitions of occupancy types, e.g., assembly occupancy

Outrigger - a structural member perpendicular to the joists, supporting a roof or floor beyond the walls

Palladian Window - a window with one large central round-arched window flanked by narrower flat-topped windows; named for Andrea Palladio, a 16th-century Italian architect; see illustration at **Window Types**

Pane - see **Light**

Parapet - a low protective wall along the edge of a roof, balcony or terrace; see illustration on previous page

Partition - a dividing wall within the interior of a building, often non–load-bearing

Patina - the weather coating of brass, bronze, and copper, acquired through age and the oxidation of the metal; also loosely applied to the general mellowing and aging of building materials

Pediment - in classical vocabulary, the triangular gable end of the roof above a cornice; also, a similar decorative element above a window or door; see illustration at **Facade**

Petrographic Analysis - a laboratory determination of the mineral content and chemical character of any masonry material

Performance Objective - a level of seismic resisting capacity that is expected of the structure. Typical performance objectives strive for risk reduction, substantial life safety, damage control, immediate occupancy, and full functionality

Period of Significance - a defined period of time during which a property established its historical association, cultural meaning, or value

Pier - a masonry structural support, more massive than a column, for an arch, lintel, or beam; often an element of a foundation system; see illustration

Pilaster - a shallow rectangular column or pier attached to a wall, often modeled on a classical order; frequently found flanking doors or windows; see illustration

Portland Cement - an extremely strong and hard manufactured hydraulic (hardens in water) cement used in concrete and mortars

Poultice - an absorbent paste applied to a surface; used to remove stains or other chemicals from a material

Preservation - the act or process of applying measures necessary to sustain the existing form, integrity, and materials of a historic property. Work, including preliminary measures to protect and stabilize the property, generally focuses upon the ongoing maintenance and repair of historic materials and features rather than extensive replacement and new construction. New exterior additions are not within the scope of this treatment; however, the limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a preservation project.

Primer - a paint applied as a first coat

Monitor

Parapet

Pier

Glossary

Pilaster

Raking Cornice

Property - a structure, its exterior and interior, related landscape features and its site and environment; for a **historic property**, this includes attached or related new construction as well

Quatrefoil - a window or opening in a pattern of four leaves; **Trefoil** = three leaves; see illustration at **Window Types**

Rafter Tail - the part of a rafter overhanging the wall

Raking Cornice - a cornice that follows the slope of a roof gable; see illustration

Reconstruction - the act or process of depicting, by means of new construction, the form, features and detailing of a nonsurviving site, landscape, building, structure or object for the purpose of replicating its appearance at a specific period of time and in its historic location.

Register - in a heating or air conditioning system, a grille with baffles for regulating the quantity of air that passes through it

Rehabilitation - the act or process of making possible an efficient compatible use for a property through repair, alterations and additions while preserving those portions of features which convey its historical, cultural, or architectural values.

Repointing - removing deteriorated mortar from between the joints of masonry and replacing it with new mortar

Reproduce - to create a copy

Restoration - the act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period. The limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a restoration project.

Retrofit - to furnish with new parts not available at the time of original construction

Reveal - the offset between two elements; the vertical face of an opening in a wall for a door or window; see illustration at **Double-Hung Window**

Reversibility - a condition which allows removal of an added material or feature and return to the original, without damage to the original

Right-of-Way - any area of land that is designated, by deed or easement, for the construction and maintenance of roads and utilities

Riser-to-Tread Ratio - a comparison of the height of an individual stair riser (the vertical part of each step) to an individual tread (the horizontal part of the step), indicating the steepness of a stair; see illustration at **Stair**

Rising Damp - moisture penetration from the ground up through building materials

Roof Types - at the Presidio, two styles of roof predominate: **gabled**, a two-way pitched roof, and **hipped**, one which slopes upward from all four sides of a building. Variations on these styles include cross-gabled roofs and hipped roofs without a ridge (pyramidal). Other roof types found at the Presidio are **gambrel** and **shed** roofs; see illustration

Rubble Masonry - masonry built of rubble or roughly quarried stone

Sash - framework for holding a single glass pane, or multiple panes with muntins, of a window; see illustration at **Double-Hung Window**

Scale - the relationship of parts, their relative size and proportions, to one another and to the human figure

Sealant - a coating applied over a joint or surface to exclude water

Secretary of the Interior's Standards - a set of standards and guidelines, issued by the U.S. Department of the Interior, National Park Service, for the acquisition, protection, stabilization, preservation, restoration, and reconstruction of historic properties. The Standards, written in 1976, and revised and expanded in 1983 and 1990, were developed pursuant to the National Historic Preservation Act of 1966 which directs the secretary of the interior to develop and make available information concerning historic properties.

Section 106 - the part of the National Historic Preservation Act of 1966 that requires every federal agency financing or licensing a project to take into account how it will affect historic properties on the National Register of Historic Places (or historic properties eligible for this register)

Segmental Arch - an arch that comprises less than a semicircle; see illustration on opposite page

Seismic Retrofit - introduction of new structural members or materials to increase a building's ability to resist seismic forces during an earthquake; all measures that improve the performance of an existing building during an earthquake, especially those that improve the structural stability and reduce the potential for extensive damage or collapse thereby assisting in the preservation of the resource and life safety of occupants and the public.

Settlement - the downward movement of a building due to the compaction of soil under the foundation; **differential settlement** is the uneven settlement of parts of a building due to varying loads or soil conditions

Shed Roof - see illustration at **Roof Types**

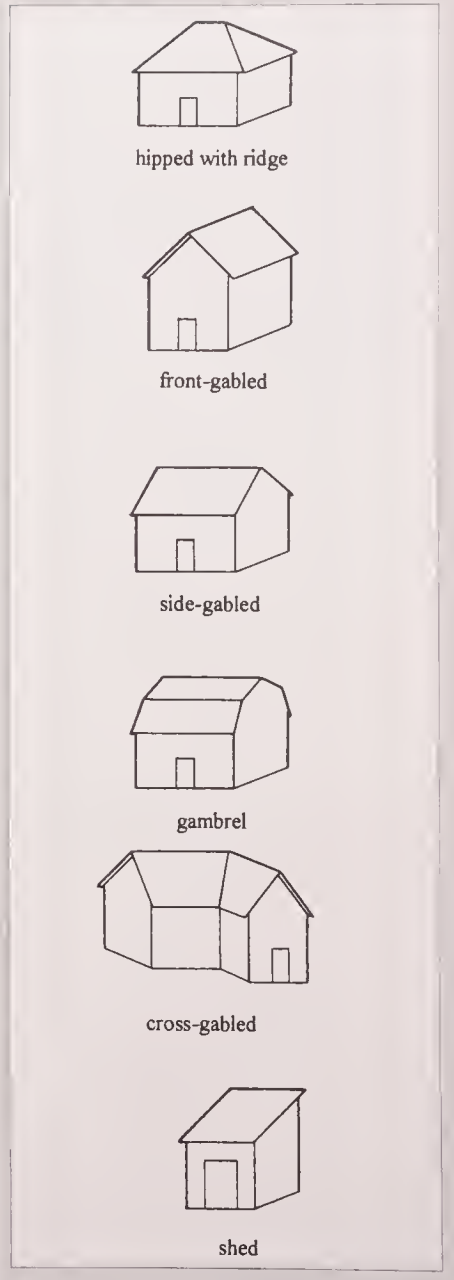
Shear - a deformation that results in building elements moving in opposite directions within the same plane, caused by a lateral load, such as wind or seismic forces; a **shear wall** is a wall designed to resist shear

Sheathing - a layer of boards or panels applied over structural members and providing a base for the application of an exterior finish material; see illustration at **Wall**

Shoring - a system of timbers or steel members providing temporary support for walls or floors during construction; also used to prevent the collapse of earth into an excavation

Significance - the meaning or value ascribed to a structure, landscape, or object; **historic significance** normally stems from integrity and historic associations and is based on National Register criteria for evaluation

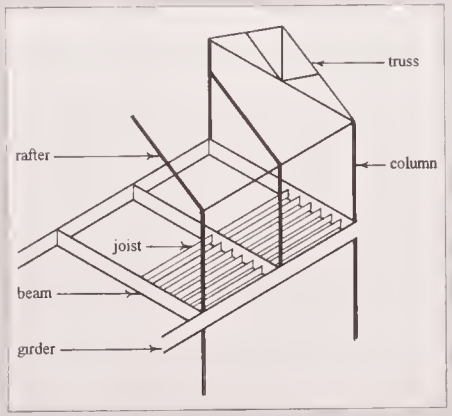
Sill - the bottom member of a window or door frame, or of a wood frame wall assembly; see illustration at **Double-Hung Window**



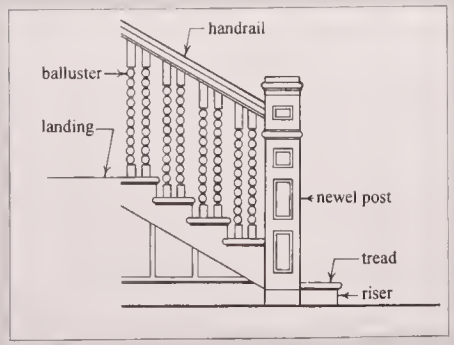
Roof Types

Glossary

Segmental Arch



Structural System



Stair

Single-Hung Window - a window with only one vertically movable hung sash

Slab - a part of a reinforced concrete floor carried on beams below; also a concrete mat poured directly on grade

Soffit - the exposed undersurface of an overhead element; see illustration at **Wall**

Spall - a surface loss of masonry or concrete; an incipient spall is the early stage of surface loss, signalled by cracking and bulging

Splash Block - a small masonry block placed on the ground below a downspout to drain water from the roof away from the building and to prevent soil erosion

Splice - to join two members by overlapping and securing their ends; usually a straight line connection

Stabilization - the act or process of applying measures designed to reestablish a weather-resistant enclosure and the structural stability of unsafe or deteriorated property while maintaining the essential form as it exists at present.

Stair - see illustration

State Historic Building Code (SHBC) - a series of comprehensive performance regulations (California Title 24, Part 8) that control and allow alternatives to prevailing codes when dealing with qualified historic buildings or sites

State Historic Preservation Officer - the official in each State or territory who consults with Federal agencies during section 106 review. The SHPO administers the national historic preservation program at the State level, reviews National Register nominations, and maintains file data on historic properties that have been identified but not yet nominated.

Steel Frame - construction type in which steel columns support steel beams

Stretcher - see illustration at **Bond**

Structural System - see illustration

Substrate - the underlying support of finish materials

Surround - an encircling border or a decorative frame

Sustainable Design - is an approach to design that recognizes that every design choice has an impact on the natural and cultural resources of not only the local environment, but also regional and global environments; the United Nations World Commission on Environment and Development defines sustainability as "meeting the needs of the present without compromising the ability of future generations to meet their own needs."

Tabby - a mixture of lime and water with shells, gravel, or stone; dries as hard as rock; used as a building material

Task Lighting - fixtures providing light for a limited area, e.g., a work surface

Tension - a pulling or stretching force as opposed to **compression**, which is a crushing force

Terneplate - sheet iron or sheet steel coated with a tin alloy, most often used as a roofing material or flashing

Terra Cotta - hard-burnt clay used for roof or floor tiles and ornamental work; sometimes glazed to mimic stone

Thermal Mass - a measure of a material's thermal storage capacity. **Thermal inertia** refers to the "fly wheel" effect by which a masonry wall stores heat from the sun and other sources and releases it later when surrounding temperatures have dropped. The process works in the opposite, cooling direction as well.

Tooling - texturing the surface of stone or shaping the face of a mortar joint

Transom Window - a window above a door; usually a hopper window which pivots open from the top with hinges at the bottom; see illustration at **Window Types**

Trefoil - see **Quatrefoil**

Trim - visible, often decorative, woodwork or molding (of various materials) of a building; frequently used to cover joints in a construction assembly

Truss - a structural assembly composed of separate members acting together to form a rigid framework; top and bottom members are chords, which are connected by diagonal or vertical members called webs that form stable triangular sections; see illustration at **Structural System**

Unreinforced Masonry - a construction type in which masonry walls have no added reinforcement to provide added tensile and shear strength, and therefore are not designed to withstand earthquake loads

Utilitarian - merely serving a purpose, nondecorative, built to fulfill a function; in building, a structure without stylistic ornamentation; also used to describe the majority of industrial and other functional buildings constructed circa 1900–1959 at the Presidio. These buildings have simple forms and gain character through their massing, materials and fenestration. They tend to lack stylistic features or to be executed in very simplified versions of styles. Typical materials are brick, board-and-batten and weatherboard siding, and corrugated metal.

Vent - in a plumbing system, a pipe providing a flow of air to equalize pressure; also the passage and outlet for moisture vapor, air, or gas to escape from a building

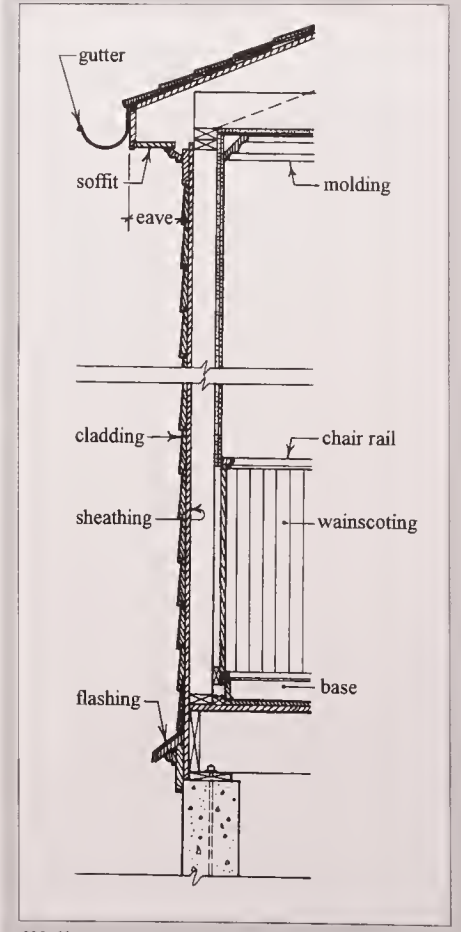
Ventilator - a mechanical device enabling moisture vapor, air, or gas to escape from a building

Vitreous Tile - tile produced at high temperatures which fuse grains and close pores, creating an impervious surface

Wainscot - a protective or decorative facing applied to the lower portion of an interior wall, frequently topped by a chair rail; see illustration at **Wall**

Wall - see illustration

Utilitarian



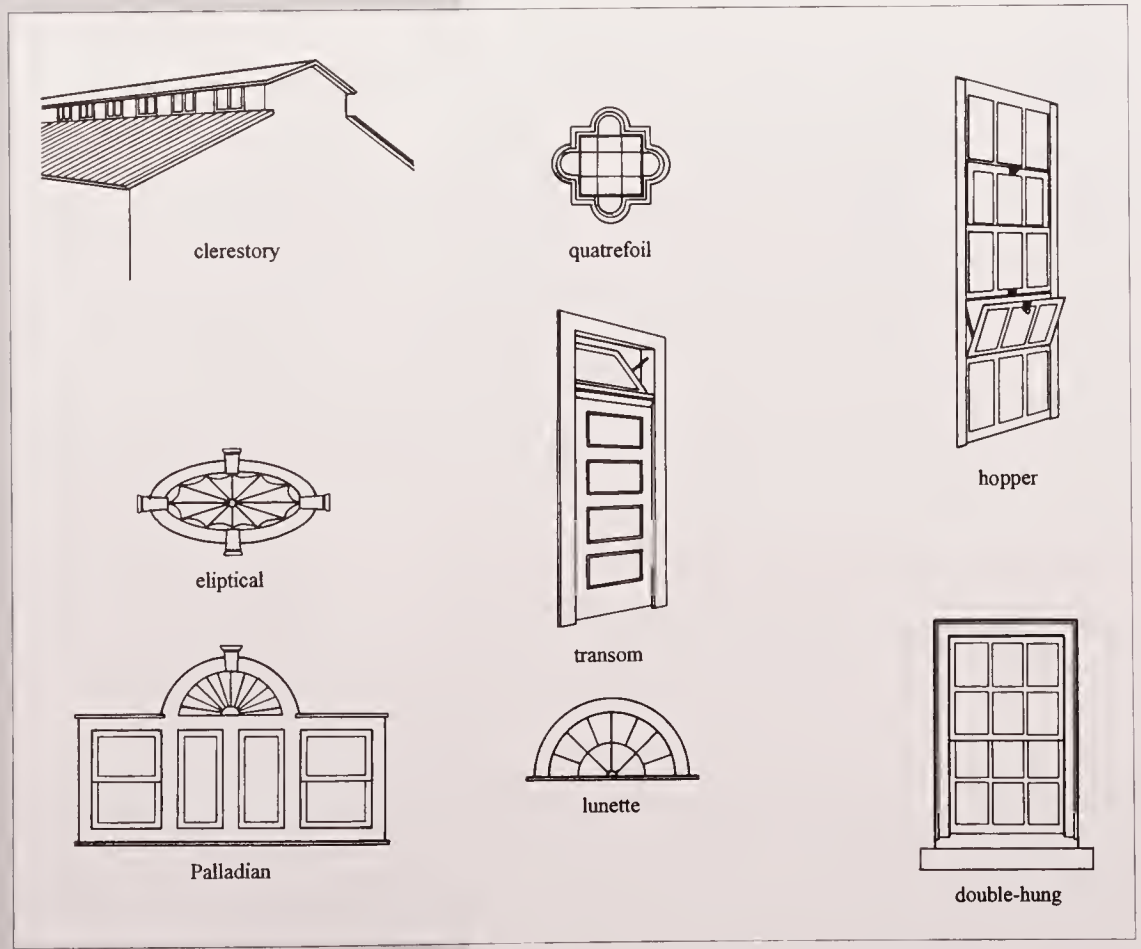
Wall

Glossary

Water table - a slight projection of a masonry wall near grade, creating a narrow ledge; see illustration at **Facade**

Whiting - a type of extender used to reduce gloss or to increase volume or texture of paint and whitewash

Winder - a wedge-shaped step, with the tread wider at one end than the other, used where a stair changes direction without a landing



Window Types - at the Presidio, the dominant window type is double-hung and the second most common type is steel industrial sash; other functional or decorative types are found less frequently; see illustration

Wood Frame - construction type in which wood columns support wood beams

Wythe - a vertical stack of masonry units, one unit thick, in a wall; in a cavity wall, two wythes of brick are separated by an air space; see illustration at **Bond**

Zoned Heating or Air Conditioning - a system in which the building is divided into a number of zones; the temperature and sometimes humidity of each zone are regulated independently by their own controls

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As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural and cultural resources. This includes fostering sound use of our land and water resources, protecting our fish, wildlife, and biological diversity; preserving the enviromental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interest of all our people, by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

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The *Guidelines for Rehabilitating Buildings at the Presidio of San Francisco* was entirely designed and produced using current digital technology. All photographs were digitally scanned and stored on CD ROM. Illustrations and line art were scanned on a flat bed scanner and stored on magneto-optical cartridges. Photograph retouching and enhancing were performed in PhotoShop 2.5.1. The book was designed using PageMaker 5.0 for the Macintosh. Final files were delivered to the press on magneto-optical cartridges. Covers and text papers are recycled stock. Soy-based inks were used in the final production printing process. ♻

U.S. Department of the Interior • National Park Service • Denver Service Center